

A Hayden Publication

April 1983

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Canada &  
International  
\$3.50

# PERSONAL COMPUTING

## A Buyer's Guide To Word-Processing Software

Using Data Banks To Build A Business

Increase Productivity  
Via Computer Communications

When You Need  
Customized Software

What Computer Games  
Can Give You



# "My Dad bought NEC TREK for all the wrong reasons."



When I told my Dad about NEC TREK, NEC's new personal computer, he wanted one right away. I told him it's a Z80-based system with 16K ROM/16K RAM expandable to 32K ROM/32K RAM.

He said it looks like fun.

I told him it has 10 programmable function keys, high-powered graphics capabilities, powerful Microsoft BASIC included, and an 8-octave programmable musical tone generator.

He said it has lots of 'fun games.

I told him how its memory storage can interface with cassette, diskette, or cartridge, and how it has a wide variety of sophisticated software available — important things like financial management packages. And how NEC gives him big system power at a small system price,

including options like their thermal printer, disk drive, digitizer touch panel, expansion unit and data recorder. The whole package for under \$2,000, and the computer itself is only \$349.

He just challenged me to a game of Protector.<sup>™</sup>

That's my Dad. I love him, but sometimes I wish he could understand how a kid feels.

## NEC

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Personal Computer Division**

1401 Estes Avenue, Elk Grove Village, IL 60007  
Nippon Electric Co., Ltd., Tokyo, Japan



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CIRCLE 1

\*TM Synapse Software



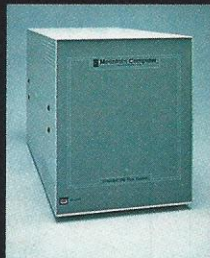
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## HOW TO GIVE YOUR PERSONAL COMPUTER A MEMORY THE SIZE OF A MOUNTAIN.

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realities of your computing job.

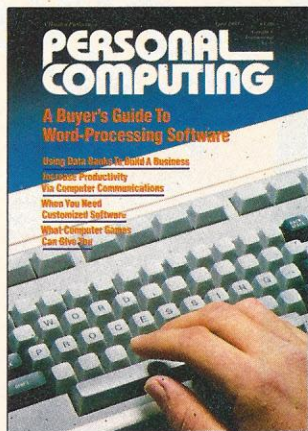
Give your Apple II, Apple III or IBM personal computer the biggest and the best. Take home the only memory system that's big enough to be called a mountain.

See your nearest Mountain dealer today or send us your business card for further information. Mountain Computer Inc., 300 El Pueblo Road, Scotts Valley, CA 95066, Tel. (408) 438-6650.



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Incorporated

## FEATURES



Words are universal. And once you've used word-processing software to process those words, you won't ever want to go back to longhand, dictating, or typing. The trick is to find the one package that is right for you.  
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THE KEYBOARD ON THE COVER IS A DETACHABLE KEYBOARD FOR THE APPLE II, COMPLIMENTS OF EXECUTIVE PERIPHERAL SYSTEMS, PALO ALTO, CA.

COVER PHOTOGRAPHY  
GEORGE B. FRY III

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Creating a personal computer weds the fine skill of a surgeon with the efficiency of an assembly line—adding brains to brawn.

### HOME

#### What's In A Game?

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Have you ever wondered why some people sit for hours at their computers playing what seem to be silly games? Well, there is a reason to think those games aren't quite as silly as they seem.

### BUSINESS

#### Doing Business From The Source

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David Hughes has integrated The Source into business ventures from teaching to publishing. But beyond all else, the data bank has enabled Hughes to remain in a small town venue, while the reach of his personal computer has grown nationwide.

### BUSINESS

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If ready-made software doesn't suit your business, consider custom programming—it may be the perfect fit.

### PROFESSIONAL/MANAGERIAL

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89

Teaming the talents of a secretary with the efficiency of a personal computer can enhance productivity—even when you're on the road.

## DEPARTMENTS

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Word processing today places the power of the written word at the disposal of anyone with a personal computer. It's a tool for organizing thought efficiently—and in the most cost-effective way

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## BUSINESS

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## SPECIAL REPORT

### Word Processing: Finding The Right Software

Which word processor is for you? It depends on what you'll do with it, and how much you'll be doing it.

110

## EDUCATION

### Learning To Win

Antonia Stone is helping to install personal computers in prisons, halfway houses, and ghetto community centers. Through game-format programs, the computer advantage is giving the disadvantaged job skills and self-esteem.

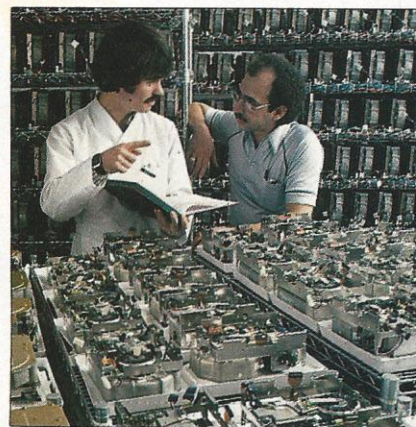
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## PROFESSIONAL/MANAGERIAL

### Computer Cure For A Doctor's Dilemma

When Dr. Chris Reilly found himself spending more time with his patients' accounts than with their ailments, he decided it was time to update his bookkeeping system. Personal computing was just the medicine he needed.

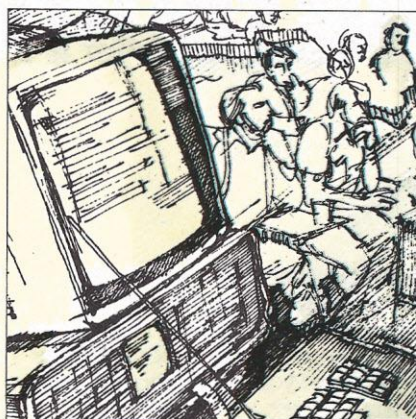
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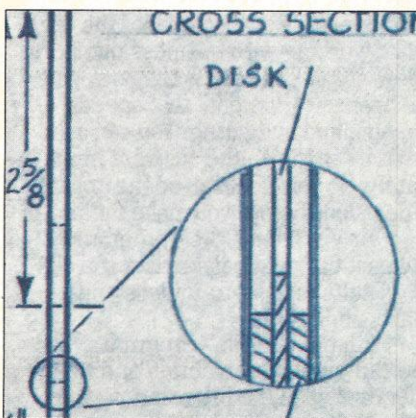
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# THE SOLUTION IS IN THE VISISERIES.

No matter what kind of problems you're trying to solve with an IBM Personal Computer, there's a program in the ever-expanding VisiSeries™ line that will give you the solution. Faster, better, smarter.

Take our VisiCalc® program for the IBM Personal Computer. It's #1 in the business. Because it takes the work out of working with business numbers. The VisiCalc program is the powerful "electronic worksheet" that speeds planning and budgeting. You can ask "what if?" and see the answers immediately. So you can analyze the impact of decisions before you make them.

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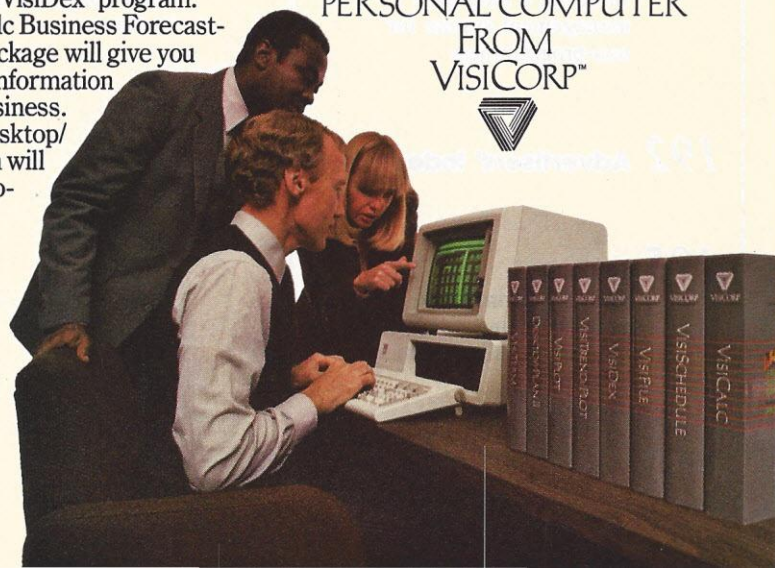
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## Revisions, Revisions, Revisions

**S**ome men of letters, it is said, were so meticulous with their thoughts and words that the manuscripts they produced in pen and ink were flawless. Their output? Perhaps a paragraph or so a day.

Some journalists I have known have been more prolific—fast, that is. I recall one fellow whose output was at least 20 pages every day. The trouble was that it took someone else another day to decipher his day's worth of work. His copy was scrawled with changes in the margins and on the back, and accompanied by a sheaf of inserts keyed to the main manuscript by "A," "B," "C," etc. On one historic occasion the inserts numbered "ZZ."

Some years ago I was privileged to work with a business executive who had a well-deserved reputation for clear, incisively written communication. From the outside, his output looked effortless. To those of us on the inside, it was anything but. The man had three secretaries at his disposal, plus a research staff of seven, and me and my staff, which consisted of two assistants, three secretaries, two clerks, and an in-house print shop with a staff of four. Typically, an important letter would begin with his or my dictation of a rough draft and then go through six or eight revisions and retypings before it was finally signed, sealed, and mailed.

All of the above, I submit, falls into the category of what today we call word processing. And all of the above, although they do serve to transmit thoughts from one mind to another, are costly methods.

Especially in today's economic environment, where even a slight edge counts for so much, such methods provide no edge; they are not cost-competitive.

There is still no substitute for human thought, but anyone with a per-

sonal computer has at his disposal a tool for organizing thought that is a light-year's leap ahead of where the task of processing words stood only a few years ago. And the personal computer has the capacity to manipulate and integrate both words and numbers into a cohesive communications document. Indeed, with a modem and another personal computer at the other end of a telephone line, no paper document is necessary.

Unlike mainframes, whose strengths lie in the ability to manage huge data bases and crunch complex strings of numbers quickly, the personal computer can be tailored to individual, personal needs. Furthermore, that tailoring can be revised at will, to meet changing needs. And that same personal computer can access the data-base (research) input of other minds.

Since much of thought processing involves both words and numbers, it is not surprising that word processing is an important consideration in dealing with the question "For what (else) can I use a personal computer?"

For some, the question is "For what?" For others, the question is "For what else?" In either case, I think you'll find our Special Report "Word Processing: Finding the Right Software" beginning on page 110, an informative update on today's word processing and how you can tailor it to your needs.

More important, I think you'll gain some insight into how word processing on a personal computer can provide an edge that is considerably more than slight.

*Paul Kellam*

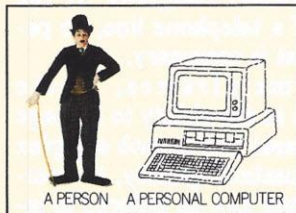
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# Simple answers to your questions about the IBM Personal Computer.

If you're personally interested in personal computers, but want to know more, these definitions, descriptions and details should help.

## "Just what is a personal computer, and how can I use it?"

The IBM Personal Computer is a computer designed for a *person*. It's a tool to help accomplish just about anything a person needs to do with information. It can help a businessperson solve complex problems just as surely as it can help a small child improve his or her arithmetic.



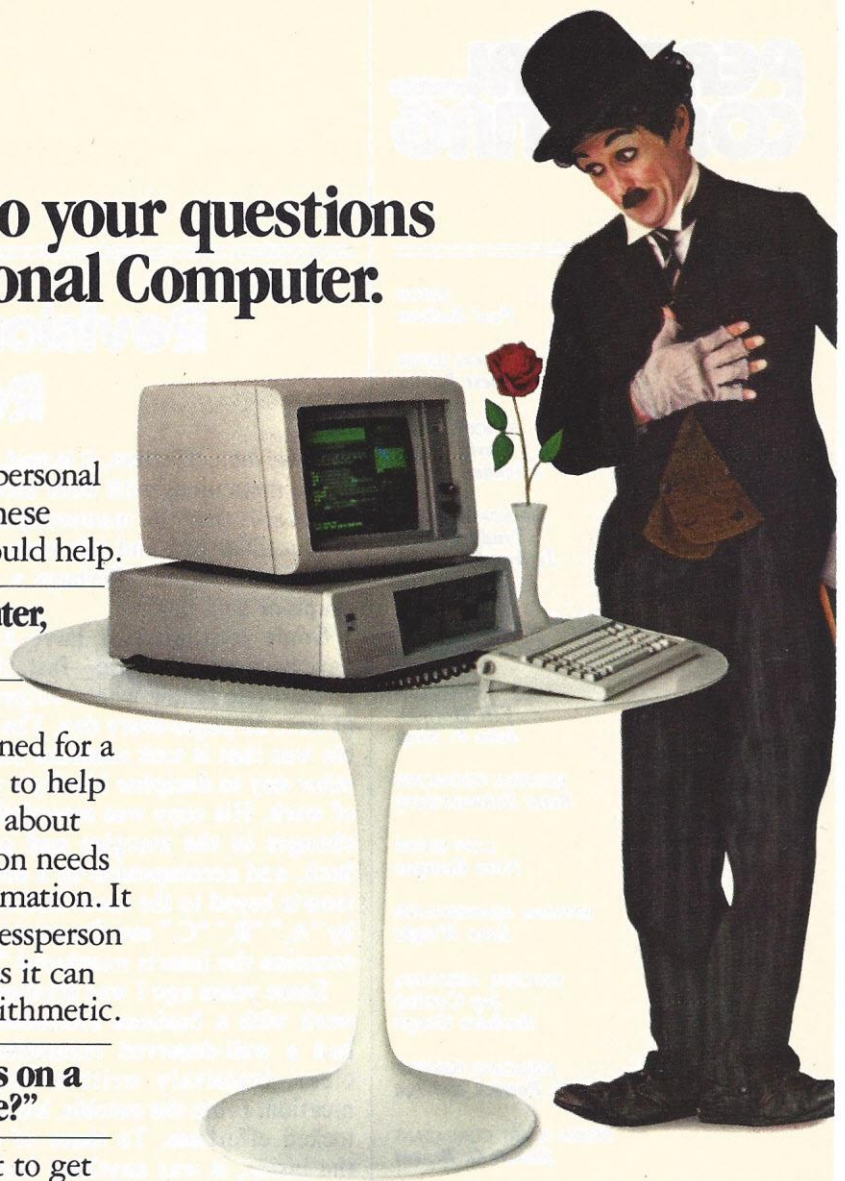
## "Suppose I've never had my hands on a computer. How 'easy' will it be?"

As with any new tool, you'll want to get comfortable with the IBM Personal Computer before putting it to serious use. You'll have some step-by-step reading, but our instructional literature involves you from the start. And the computer is on your side too—interacting with you as you learn. There's no reason why you can't be executing programs and feeling good with the results within your first week. After a month, it should be clear that you've made a good investment, and you'll probably be telling your friends why they should get one.



## "Is the IBM Personal Computer simpler or more advanced than others?"

Both. Our system has been engineered with many advanced design features (see the chart) but their purpose is to make it simpler for you. Our ten function keys are a good example. We added them to save you a lot of time and error. They are *advanced* features that add to *simplicity* and ease of operation, and that is typical of our total design.



## "What kind of software programs do you have to help me?"

IBM Personal Computer software comes in many varieties, and it's all quality.

For example, if planning is part of your work, we have VisiCalc\*— the "electronic worksheet." If you maintain a business, we offer programs that help handle everything from accounting to inventory and payroll record keeping. We also have carefully chosen programs for educational use, intelligent games, a word processing program, plus communications packages that connect you and your computer to outside information services via your telephone and a device called a modem.



## "How expensive and how expandable is it compared to others?"

Because of the extraordinary amount of advanced, built-in features available in the IBM Personal Computer, it can give you more quality, power and performance for your money. You're also buying extraordinary expandability— beginning with user memory that can be increased up to 32 times. (In the chart at right, one needn't be a technical whiz to add up all



### IBM PERSONAL COMPUTER SPECIFICATIONS

<b>User Memory</b> 64K-640K bytes*	<b>Display Screens</b> Color or monochrome High-resolution* 80 characters x 25 lines Upper and lower case	<b>Permanent Memory</b> (ROM) 40 bytes*
<b>Microprocessor</b> 16-bit, 8088*	<b>Operating Systems</b> DOS, UCSD p-System, CP/M-86†	<b>Color/Graphics</b> <i>Text mode:</i> 16 colors* 256 characters and symbols in ROM*
<b>Auxiliary Memory</b> 2 optional internal diskette drives, 5¼" 160K bytes or 320K bytes per diskette	<b>Languages</b> BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL	<i>Graphics mode:</i> 4-color resolution: 320h x 200v* Black & white resolution: 640h x 200v* Simultaneous graphics & text capability*
<b>Keyboard</b> 83 keys, 6 ft. cord attaches to system unit*	<b>Printer</b> All-points-addressable graphics capability Bidirectional* 80 characters/second 18 character styles 9 x 9 character matrix*	<b>Communications</b> RS-232-C interface SDLC, Asynchronous, Bisynchronous protocols Up to 9600 bits per second
<b>Parity checking*</b>		

\*ADVANCED FEATURES FOR PERSONAL COMPUTERS

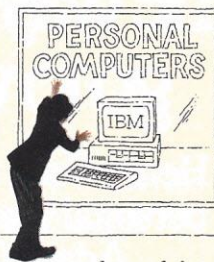
the features that make our personal computer a very good buy indeed.)

## "If I want a demonstration, where do I go and who will show it to me?"

Go to any authorized IBM Personal Computer dealer. The salespeople there have received special training and you should find them all quite helpful.

Ask your dealer to run the software programs that interest you most, and get your hands on the system yourself. Then you'll begin to see what this tool for modern times can do for you.

For more information on where to buy the IBM Personal Computer, call 800-447-4700. In Alaska or Hawaii, call 800-447-0890.



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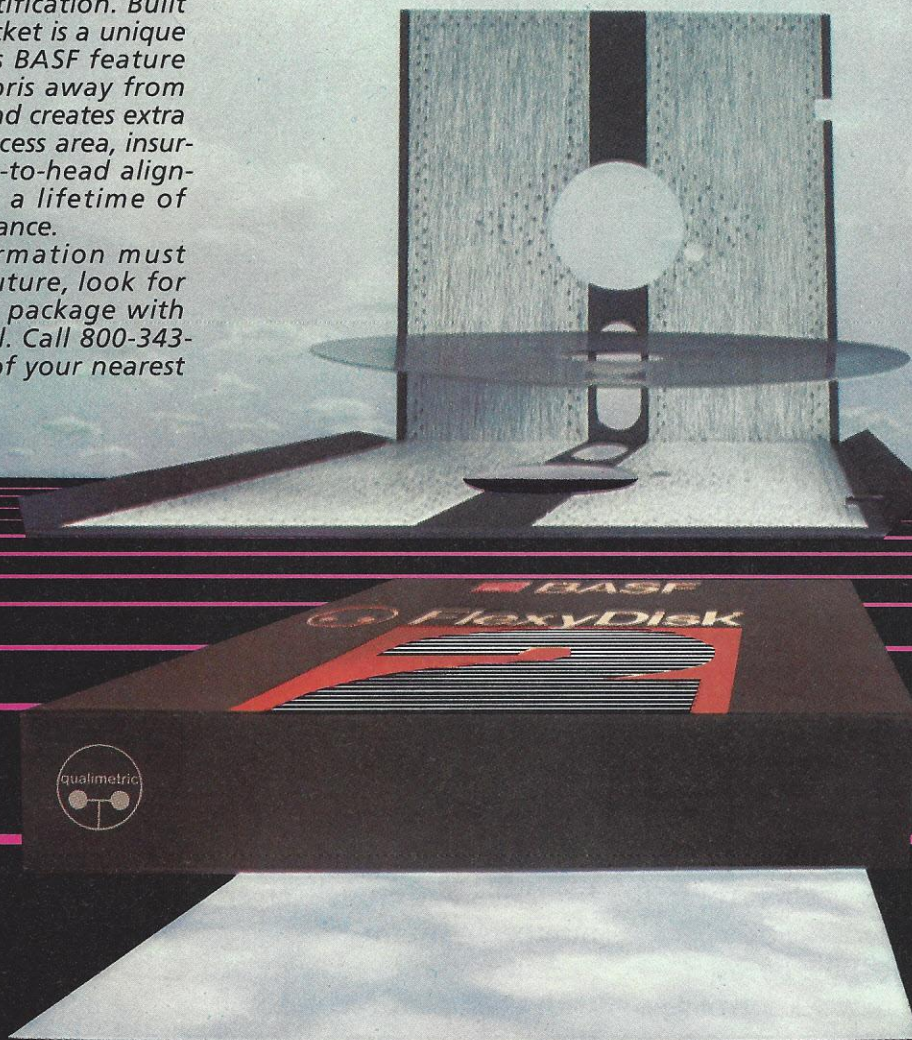
The \$1795 suggested retail price for the Osborne 1 (a trademark of Osborne Computer Corporation) includes a full business keyboard, built-in CRT display, two built-in floppy disk drives, CPU and 64 kilobytes of RAM memory, RS-232 and IEEE 488 interfaces, and the following software packages: WORDSTAR® word processing with MAILMERGE® (a registered trademark of MicroPro International Corporation of San Rafael, California); SUPERCALC® electronic spreadsheet system (a trademark of Sorcim Corporation); CBASIC® (a registered trademark of Compiler Systems); MBASIC® (a registered trademark of Microsoft); and CP/M® (a registered trademark of Digital Research).

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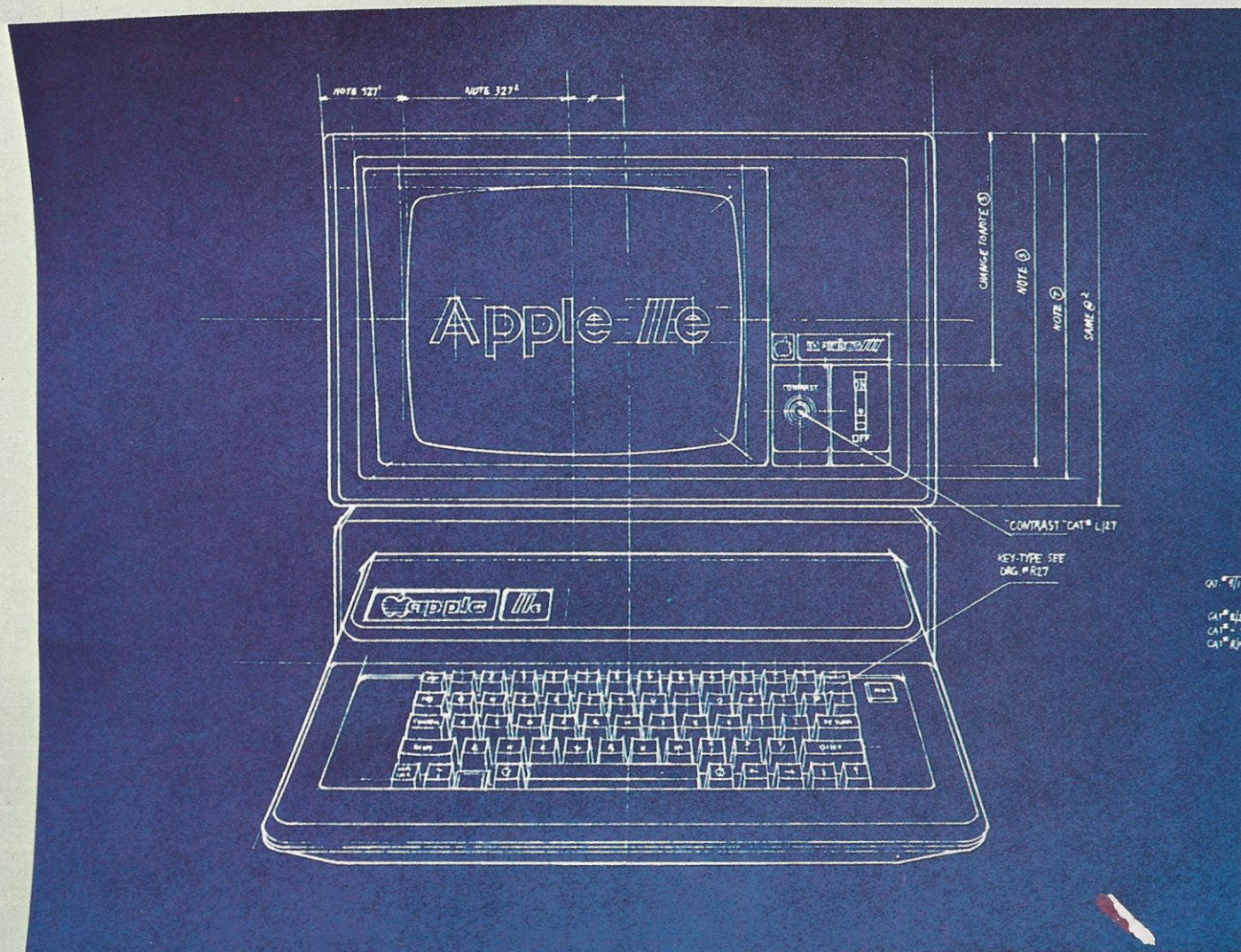
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\*Contact BASF for warranty details.

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CIRCLE 114

# It's the same old Apple II.



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The "e" means enhanced. Which means a bundle of new features:

A standard memory of 64K (versus 48K) that's easily

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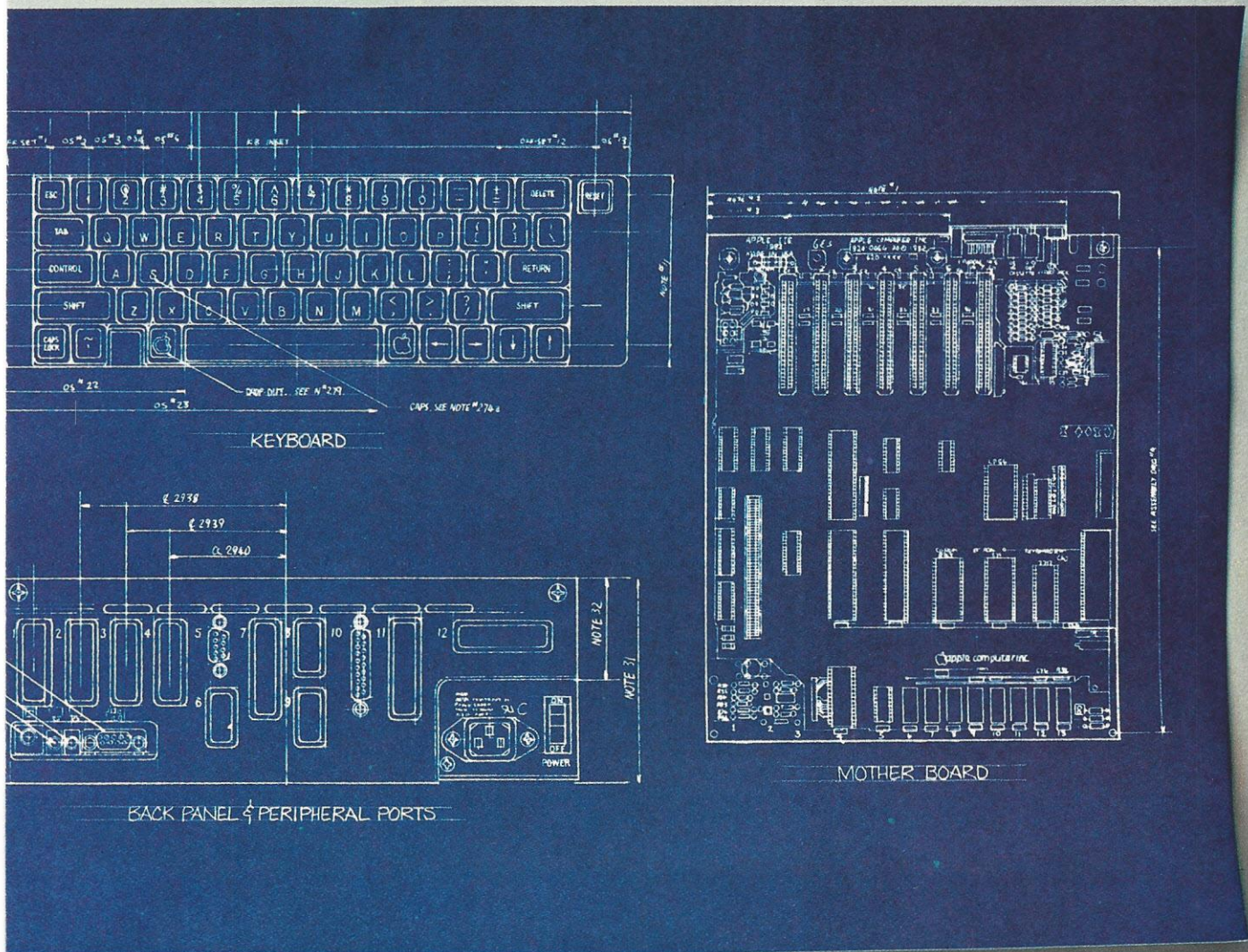
A new, improved keyboard, with a complete set of ASCII standard characters. Plus full cursor controls, programmable function keys, and a rapid auto-repeat feature built into every key on the board.

Both upper and lower case

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Improved peripheral ports. Which make it a lot easier to connect and disconnect game controllers, printers and all those other wonderful things that go with an Apple Personal Computer.

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Self-diagnostics. That's a special feature that makes it easy to give your computer a thorough check-up.

Plus an even more reliable design. Achieved by reducing the number of components—which is to say, the number of things that could go wrong.

And bear in mind, the IIe still has all those other virtues that made the Apple II so very popular. Including access to more accessories, peripheral devices and software than any other personal computer you can buy.

So visit any of our over 1300

authorized dealers, and see the newest Apple for yourself.

Like the original, it's rather extraordinary. But then some things never change.



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- Color II Monitor, 13", 560(H) x 240(V) line resolution, 80 x 24 character display.
- Model "Video-310A" amber phosphor screen with TTL video input. Connecting cable included.
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Multicolor plots on the DMP-40 are a simple matter since built in firmware and most commercial software provide 'pause' commands for pen changing.

These and more big-plotter capabilities are yours at small-plotter cost.\*

*For the name and location of your nearest distributor, call 512-835-0900 or 1-800-531-5205 outside Texas, or write Houston Instrument, 8500 Cameron Rd., Austin, Texas 78753. In Europe contact Bausch & Lomb NV, Rochesterlaan 6, 8240 Gistel, Belgium, Tel 059-27-74-45, Tlx 846-81399.*

\*US retail \$995.

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## GREAT NEWS FOR EVERYONE WITH A PERSONAL COMPUTER: A NEW BREED OF PRINTER, PURRRFECTLY PRICED.

### High Performance Word and Data Processing For Under \$700.

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Okidata's new multifunction Microline (ML) 92 printer is just the animal. For letters, memos or manuscripts, this advanced dot matrix printer gives you text printing that's a match for any daisywheel's. It prints graphs, charts and illustrations. Even emphasized and enhanced printing to help you stress a point. As for data processing, this cat doesn't pussyfoot around. Information flies from the 92 at 160 cps. And there's an ML 93, too, that adds wide-column printing to the picture.

Like each in our full line of high performance printers, the new ML 92 and 93 are built strong to keep on run-

ning, right down to the print head that's guaranteed for one full year. But the really great news about each is price: \$699 suggested retail for the ML 92; slightly more for its wide-column partner. Absolutely purrrfect.

For more detailed information, and for the name of the dealer nearest you, call 1-800-OKIDATA. In NJ, 609-235-2600.

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share the capabilities—and costs—of mass storage, printers and other peripherals.

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CIRCLE 6





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boy are you gonna be sorry.

# Epson.

The new Epson QX-10 is unlike any personal computer you've ever seen. It's a computer for people who don't have the time to learn computers; a computer you can be using within minutes.

And fortunately, you don't have to take our word for it. Here's how *Byte*, one of the computer industry's most prestigious magazines, describes the QX-10.

**The first anybody-can-use-it computer.**

"The Epson QX-10 (is) a computer for less than \$3000 that may well be the first of a new breed of anybody-can-use-it 'appliance' computers ... In addition to being a highly integrated word processing/computer system that offers as much usable processing power as almost any existing microcomputer, the QX-10 ... system is designed to be used by people with minimal technical knowledge. We've certainly heard that claim before, but Epson has delivered on this promise in a way and to an extent that no microcomputer manufacturer has done."

That's nice to hear from a magazine like *Byte*, of course, but it doesn't surprise us. It's just what we intended the QX-10 to be all along.

**More computer. Less money.**

But useability isn't the only thing the QX-10 has going for it. As *Byte* says, "the QX-10 gives you a great deal for your money."

"Help is available at any time through the HASCI (Human Application Standard Computer Interface) keyboard Help key ... Text can be entered at any time just as you would in a conventional word processor. The Calc key turns the system into a basic

4-function calculator. Graphics can be created via the Draw key. The Sched (schedule) key gives you access to a computer-kept appointment book, a built-in clock/timer/ alarm, and an event scheduler."

**Advanced hardware for advanced software.**

As for hardware, *Popular Computing*, another industry leader, says: "The QX-10 includes ... a number of advanced hardware features ... The basic components of the system are a detachable keyboard, a high resolution monochrome display, and a system unit containing two 5¼ inch disk drives. The drives use double-sided, double-density disks (340K bytes per disk) and are amazingly compact ... The QX-10 uses an 8-bit Z80A microprocessor. The system contains 256 bytes of RAM. Some of the RAM is ... battery powered ... which lets the computer retain information when the power is off."

**You won't have to wait much longer.**

The new Epson QX-10 may very well be the computer you've been waiting for. And fortunately, you won't have to wait much longer — it will be appearing soon in computer stores all across the country. In the meantime, write Epson at 3415 Kashiwa Street, Torrance, CA 90505, or call (213) 539-9140. We'll be happy to send you copies of our reviews.

After all, as *Popular Computing* puts it, the QX-10 will "do for computing what the Model T did for transportation."

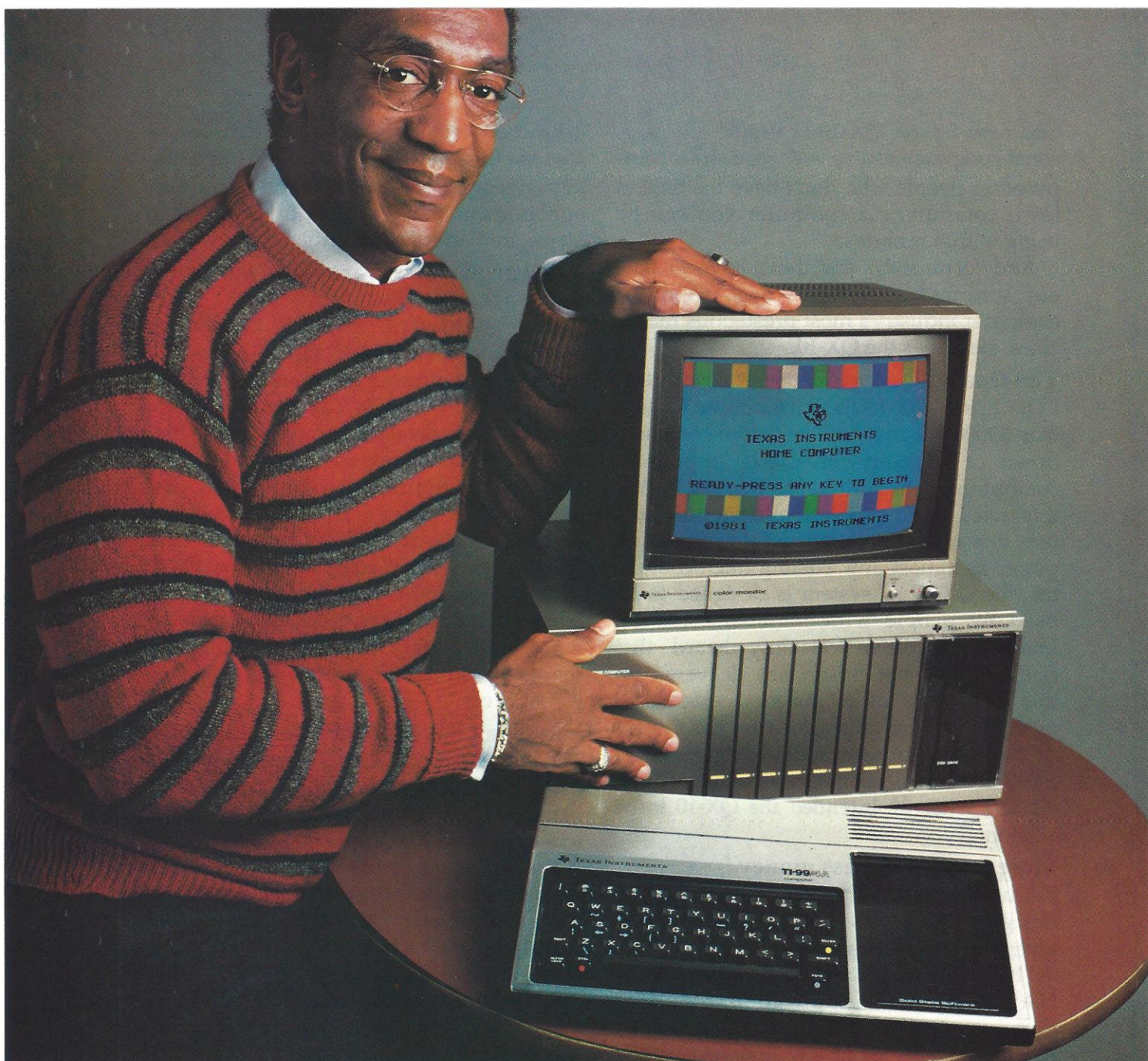
And we couldn't have said it better ourselves.



CIRCLE 96

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CIRCLE 5

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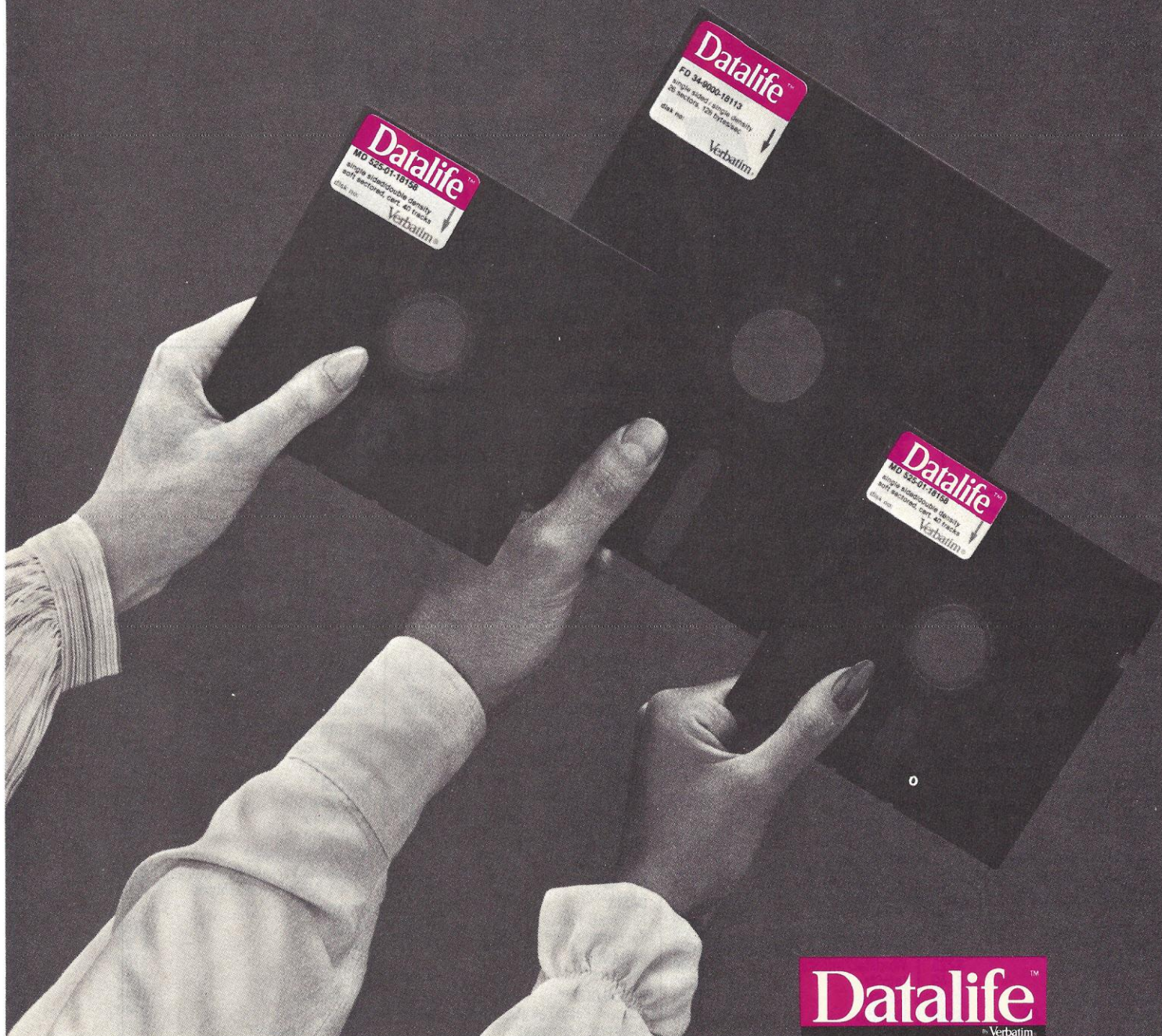
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CIRCLE 7

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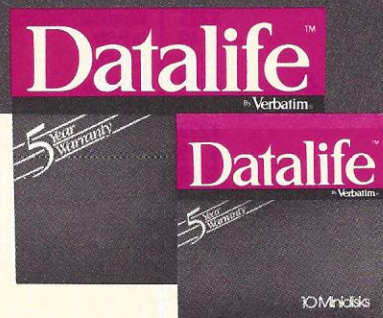


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CIRCLE 124

## Can A Personal Computer Monitor Water And Electricity Use?

**I**n this monthly column "Answers" we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

**Q.** We are in the process of building a new house, and I wonder if there's any way to install a small computer to monitor the amounts of water and electricity used, and to control and monitor the heating system, possibly solar. If so, what kind of computer would you recommend, and what brand? Can this computer then be used as a personal computer as well? Will the TRS-80 Model III work?

**A.** Those are a lot of questions, but here goes. First, last month we told you how two different people managed to install home-control systems in their existing homes. They used BSR controllers and personal computers—one a Radio Shack Color Computer, and the other an Apple II.

Almost any personal computer, or just plain old computer, for that matter, will work to do what you want, provided the external devices are present, and provided the software exists to do the monitoring and controlling. When the computer controls or monitors the home, though, that's all it can do. You'll have to stop monitoring and controlling to do word processing, for instance.

External devices are something of a problem. If you want to monitor the amount of electrical energy your

house is using, you'll need some kind of watt meter. Watts are the units of electrical power. When you constantly measure the instantaneous number of watts flowing into your house and keep a running total, you can tell the total amount of energy you've consumed since the last time you checked the total. The electrical meter on your house, called a watt-hour meter, does this through its dials, giving the result in kilowatt-hours of energy. (Kilowatts are power, kilowatt-hours are energy.) You'll need some kind of monitoring device to handle this electrical monitoring that provides an input to your computer. We're sure they exist, particularly in industrial versions, but we don't know where to get them. Your builder or architect might be able to find out, though.

To monitor the amount of water used, you'll need a flow meter with digital outputs. We're sure they exist, too, but again, we don't know where they're available. Such quantities are routinely monitored and controlled in industry, so appropriate meters shouldn't be too tough to find. Cost might be prohibitive, though.

Assuming you can find the meters, the next problem will be interfacing them with the computer, and this may require a bit of electronics knowledge. If you don't have the know-how, maybe you or your builder can find someone else who does.

Controlling the heater and air conditioner can be done. We've cautioned in our home-control article that some kinds of heating systems are difficult to control, so be aware of

that. You should also note that Compu-Home systems in Denver, Colo., has a home-control system for the Apple II that controls a furnace, air conditioner, and hot tub. Russ Coffman, Compu-Home vice president, can put you in touch with a builder in the Denver area who installs home-control systems in new construction there, and may be able to help.

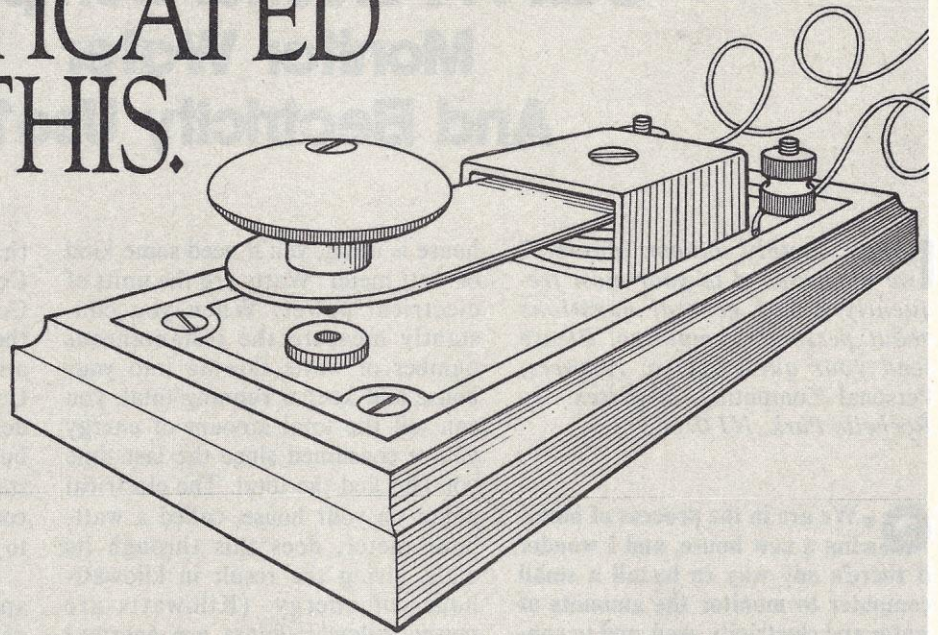
In general, controlling lights and appliances in a home is easy. Sensing and monitoring conditions other than time, however, is a problem that manufacturers haven't yet solved for personal computers. So you can do part of what you want to do, but some of it will take custom installation that could become costly, and probably isn't worth it unless you just want to do it as a hobby.

**Q.** I have quite a few BASIC programs that we are trying to translate into CBASIC. Currently I am using the book *CBASIC A Reference Manual, Version 2* (Compiler Systems Inc., 1981). Can you recommend another book?

**A.** One of the most popular guides to CBASIC is the *CBASIC User Guide* by Adam Osborne, Gordon Eubanks Jr., and Martin McNiff, (Osborne-McGraw Hill, 1981). If you can't find the book locally, Columbus Books of San Francisco carries it. Just call them at (415) 896-0611.

According to Digital Research, the purveyors of CBASIC, converting BASIC to CBASIC is fairly straightforward, except for accessing files.

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The folks at Digital Research suggest breaking your conversion efforts into two parts, saving file access for last. Digital Research has a customer hotline for assistance on specific questions, by the way. And rumor has it that a translator program may be on the way, but we haven't yet received any details.

**Q.** After much thought and research, I decided to buy a Commodore 64 personal computer. Now my frustration is complete, because I have been unable to purchase manuals anywhere to work the software I have. I am very impressed with what a Commodore may do, but when will its promise be fulfilled?

**A.** It's happening now. A company called Quick Brown Fox (New York, N.Y.) is advertising a word processor of the same name that runs on the VIC-20 or the 64. Quick Brown Fox sells for \$65. And Commodore says it will have a complete software series for the 64, called the Easy series, shipped as you read this. Each of the modules in the series—EasyCalc and EasyWord, for example—is supposed to cost less than \$100.

**Q.** Have you had any reader response to your request for CP/M games that appeared on page 16 of your December 1982 issue?

**A.** Response has been steady, but not overwhelming. The last we received is from Steve Carmichael in Kennewick, Wash. He says, "In answer to your search for games in CP/M, we have found some for the Osborne 1 through: Public Domain Users Group, Osborne 1 computer, A-1 Computers Inc., P.O. Box 1442, Orange Park, FL 32067.

"The games do not have graphics, but I purchased the classic game of Adventure and it ran flawlessly, providing days of fun. Prices are very

low—\$10 for Adventure and a program of biorythm."

Then we received a letter from Kirk Thompson of Oxford, Iowa. Thompson gave us a list of CP/M game vendors, which he says he received from *Sextant: The Independent Business Magazine for the Entire Zenith Computer Community*. Here's the list:

- Acme Business Computers, 1727 East Sprague, Spokane, WA 99202.
- Ralph Boyd, 761 NW 196 Terrace, Miami, FL 33169.
- California Data Base, Suite 107, 917 A St., Hayward, CA 94088.
- Everywhere, Box 60802, Sunnyvale, CA 94088.
- Kajon Computing Company, 709 Beacon Hill Dr., Irving, TX 75061.
- Newline Software, Box 402, Littleton, MA 01460.
- SAM76 Inc., Box 257, Route 1, Pennington, NJ 08534.
- Software Toolworks, 14478 Glorietta Dr., Sherman Oaks, CA 91423.
- Stuart Software, Suite 316, 25381 Alicia Parkway, Laguna Hills, CA 92653.
- Studio Computers Inc., 999 S. Adams, Birmingham, MI 48011.

Thompson says you should check these vendors, particularly since they may only have the games in 5 1/4-inch format for Heath-Zenith computers, and not in the standard CP/M 8-inch format.

We appreciate the time and effort everyone put in to help us in this quest.

**Q.** I am doing word processing with WordStar, which has been adapted to my Xerox 820. The program has been modified to print using my Epson MX-100 printer. But when I use the subscript and superscript functions, the characters are printed on the same line as the text, rather than in the superior or inferior positions. How do I get true sub- and superscripts?

**A.** You probably have the original Epson MX-100 printer, which did not do sub- and superscripts. Check your manual. If we've guessed right, for under \$100 you can get the Graphtrax modification kit from your dealer and enjoy sub- and superscripts, not to mention incremental line spacing, italics, line-drawing graphics, and true back-spacing.

If your printer does any of the things we just listed, you do have the later MX-100 model. In that case, it's most likely that your WordStar was configured to match the original MX-100's capabilities, which didn't include sub- and superscripts. All you need to do in this case is run WordStar's configuration module. It will ask you if your printer can handle a list of specific functions. Have your printer's specification sheet in front of you, and answer yes when WordStar asks you if you have sub- and superscripting.

It's easy to think a program has been properly configured for a printer, because even an unconfigured program will often generate ordinary printing output. You don't run into trouble until you try to use special features.

**Q.** Our computing system resides in our bedroom. How do I make the printer quieter so I can work late while my mate sleeps?

**A.** There are two things you can do to solve your problem: Either put the computer in another room for late-night sessions, or buy a sound-reduction hood for your printer. Trace Systems (Mountain View, Calif.) makes a \$109 sound-reduction hood called the Sound Trap, that fits over a variety of dot-matrix printers. (A \$129 version tilts the printer up to make room for a compact paper-handling stand.) If you have a larger, letter-quality  
(continued on page 27)

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The Spinwriter's 50 print thimbles can more than triple your PC's usefulness. They come in both constant pitch and proportional-spaced fonts, plus in foreign language, technical and scientific versions. They snap in and out in seconds, and let you print up to 203 columns on 16-inch paper. They each last for more than 30 million impressions.

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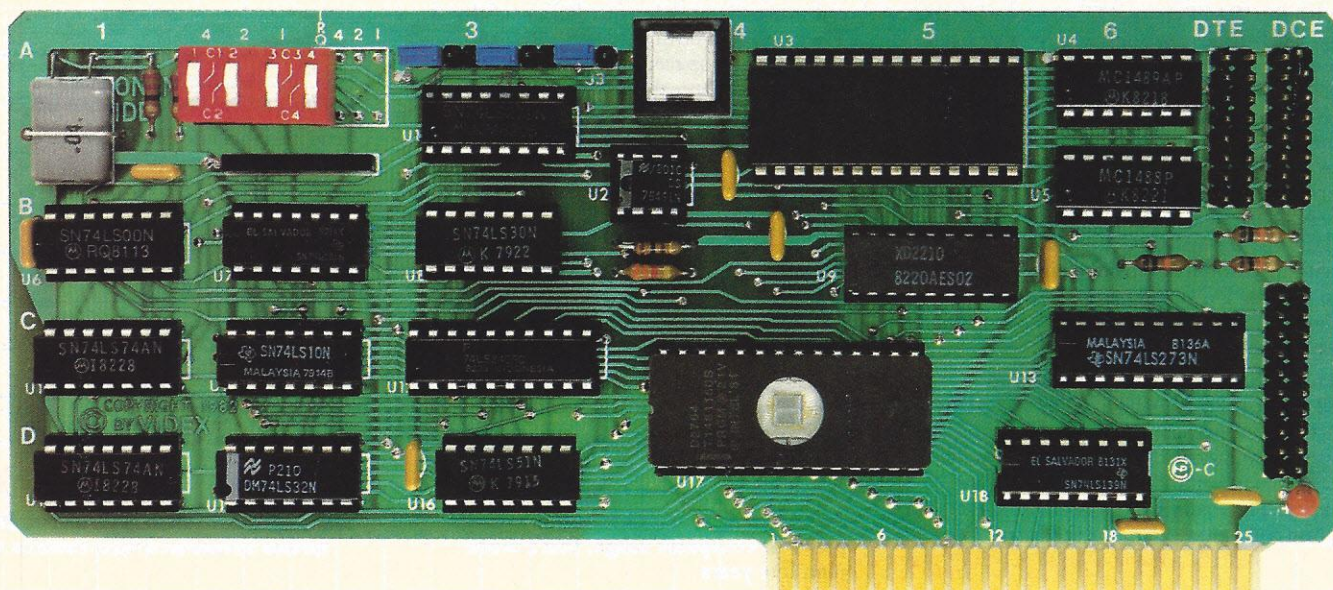
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CIRCLE 13

(continued from page 23)

printer, Radio Shack makes a hood for about \$400, but you will have to make sure the hood will fit, which depends on your printer's paper-feed path. Since the average printer makes a sound like a swarm of giant robot mosquitoes, a sound hood could have a big payoff in domestic tranquility.

**Q.** My family is interested in learning to use my personal computer for word processing. In your opinion, should I take them by the hand and show them step-by-step, or is the hands-on approach the best way to go?

**A.** The best way to teach people to use anything is to let them use it themselves. So the hands-on approach is the best. You may feel an overpowering urge to reach over shoulders and start punching keys to help out. Don't. Let them do it themselves. Always be available to answer questions and deal with problems. And remember to stress, too, that nothing they can do to the keyboard (short of dropping it on the floor or tossing it out the window) will harm the machine.

**Q.** Recently, while the humidity was very low, a colleague walked into my office and casually touched my computer. The system crashed and everything in the memory was lost. I assume the culprit in this case was static electricity. I've asked people to ground themselves by touching the desk or the door, before they touch the machine, but they hesitate because they are afraid of getting zapped. What else can I do?

**A.** Distributing the electrical discharge over a wide surface area does eliminate this problem. But you can prevent static buildup in the first place by putting an antistatic mat underneath your system, and/or

by applying antistatic spray. Many companies sell such items, and in most cases, for a relatively low price. Radio Shack, for example, sells an antistatic mat for \$80, and an antistatic spray for \$6.

If you don't want to buy anything, however, some computers, like the new Apple //e, have a built-in cure for static problems. In these computers, the power-supply housing is exposed. Touching it before touching the rest of the machine will harmlessly ground the electrical charge.

**Q.** I recently bought an IBM Personal Computer with a Davong 5 Mbyte hard disk. The hard disk developed a squeal that my dealer said was caused by a bearing. He fixed it, but now the noise is coming back. That's not the real reason for my question, but I'd appreciate any insights you might have.

My real problem has to do with floppy disks. My dealer doesn't believe in floppy-disk head cleaning; he says it causes more problems than it prevents. I respect his opinion, but his advice contradicts everything I've read in computer books. I should tell you the computer is used in the home environment, not a dust-free computer room.

What do you think about this? Should the heads be cleaned, or should I follow the philosophy applied to VCRs—the less cleaning the better?

**A.** That's a tough question to answer. We've read all the computer books, too, and we know what they say. On the one hand, we've had computers with floppy-disk drives running for quite a while with no apparent problems in the drives. On the other hand, we do have one disk drive in our editorial offices that indeed needs care for its head.

This particular disk drive is located in a room populated by two or three (it depends on the time of month—two most of the time, three when the

magazine is being put to bed) people who smoke. The room has no windows. The computer the drive is connected to is in almost constant use—at least eight hours a day, every business day, with frequent disk accesses.

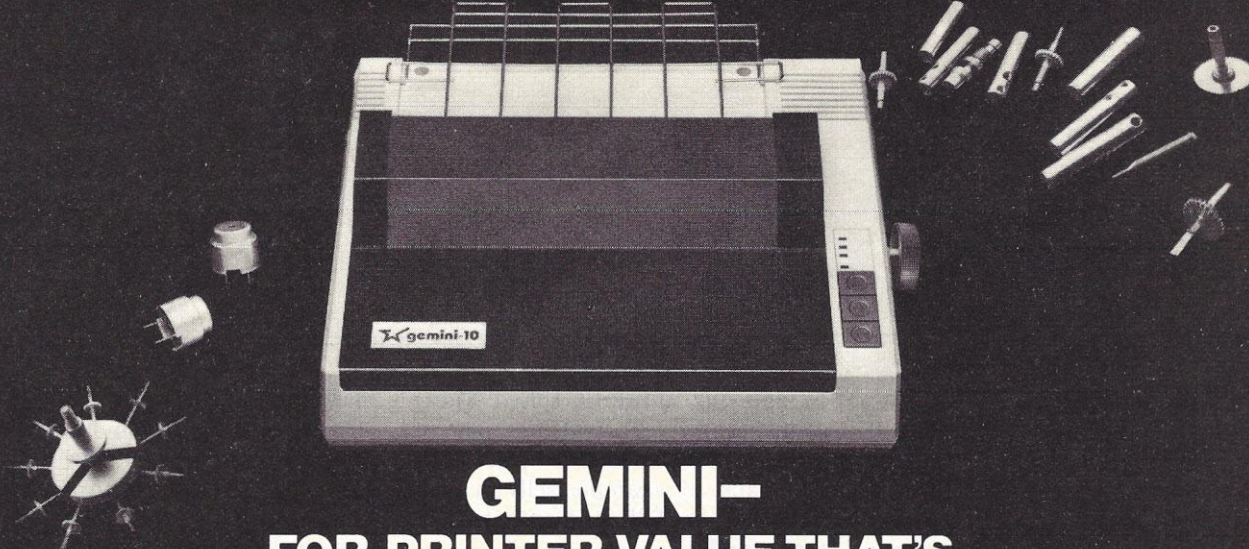
After we cleaned the head in the drive attached to this computer, the incidence of disk errors dropped dramatically.

So we think the heads in floppy disk drives need to be cleaned. We believe this from the structure of the drives, as well as from our own experience.

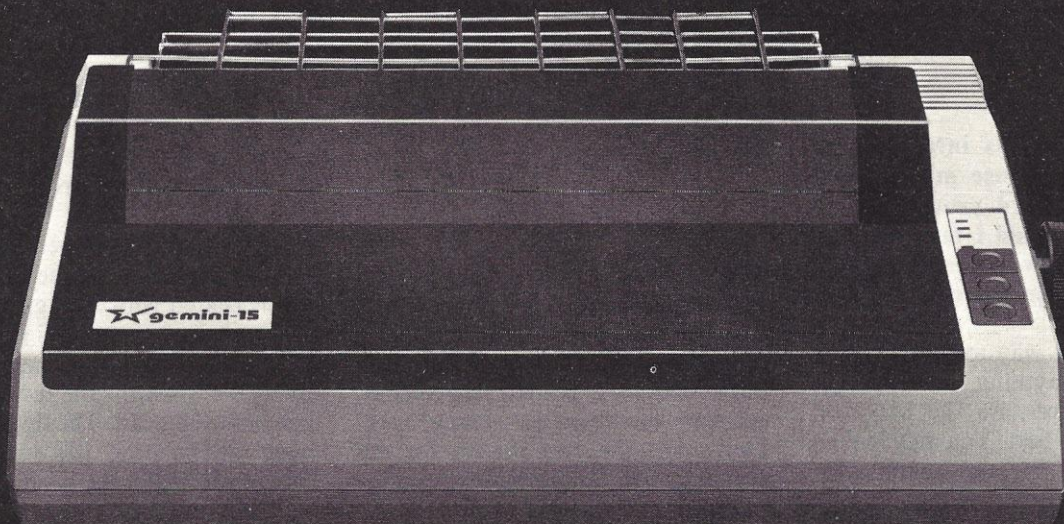
Floppy disk drives operate with the disk in contact with the head. The disk is coated with a magnetic material composed mostly of iron oxide. As the disk moves past the head, this iron oxide wears off the surface of the disk onto the head. The deposition of oxide on the head has two effects. First it will make the head less sensitive, so it can't pick up weak signals from the disk surface, and second, it causes the disk surface to wear faster, because the oxide particles aren't as smooth as a newly polished read/write head.

Just when you should clean the heads is another question. As we said, some of our drives have been going for quite a long time with no problem. That one drive, though, needed attention. Some software publishers recommend cleaning the heads every other week, while other people interested in computer maintenance say they only need it every six months. Our guess is that six months is closer to the mark, unless you're really using the drive heavily, in which case your maintenance schedule should be more frequent.

While we're at it, we should mention one other thing you can do for your drives. You should have the heads aligned and the rotational speed checked. An error in either of these features can cause bad reads and writes. If you notice your drives starting to foul up, and head cleaning



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doesn't solve the problem, consider taking the drive in to the dealer for a tuneup. And if you want to avoid all these annoyances, an annual tuneup should keep your disk drives healthy.

**Q.** I'm considering the purchase of either an IBM Personal Computer or a Hewlett-Packard HP-120. The dot-matrix printer available from each firm is evidently the Epson MX-80 with the computer maker's label affixed. Is there any reason I shouldn't save some money by buying my printer with Epson's own label on it?

**A.** Yes. While all Epson MX-80 printers are identical in almost all respects, the small differences could be reason enough for you to go with the model the computer manufacturer offers for your particular computer. For one thing, if you're contemplating a service contract, IBM and HP will only put their own Epson—so to speak—on such a contract.

There are also some changes in the product itself, added to suit different manufacturers to whom Epson sells printers. For instance, the HP model is available with the HP-IB (IEEE-488) or HP 12 interface, as well as the standard RS-232-C interface. Only the latter is readily available with the standard Epson, so you should see just how you want to hook the printer to the computer before you buy. Also, the HP-Epson's firmware is configured to use the printer operation commands common to other HP printers, so if you have other HP printers it will make things simpler by sticking to equipment that uses one set of commands. The HP version also has some graphics firmware built in to allow screen dumps. According to Hewlett-Packard, you can't get this feature if you buy Epson's Epson.

A similar set of arguments holds true for the IBM/Epson printer. Again, it is identical to the Epson

MX-80 in most respects, but some changes have been hardwired to IBM's version.

Make sure you can accept what you're giving up before you get your printer without that computer maker's label on the front.

**Q.** When buying floppy disks (5¼-inch) for my company, I noticed that they come in various densities—single, double, and quad. Should I get the highest density? Is it worth the added cost?

**A.** Choosing a particular disk because of its density is similar to choosing the gasoline you put in your car according to the amount of octane it contains. You really don't need more than the minimum required by your system.

If your disk drives store 125k unformatted, and between 80 to 100k formatted, single-density disks will be fine. If your drives store 125 to 250k unformatted (about 230 to 235k formatted), then you'll need double-density disks. Quad-density disks are needed for drives that store up to 480k. All these figures refer to the storage on one side of a disk, so for double-sided floppies, just double the figures given here.

Sometimes you can get by with disks of a lower grade than we've specified here. For instance, although an Apple disk drive stores 143k unformatted, single-density disks will work.


The term "density," by the way, actually refers to two different things: recording density and track density. Single-density disks store data at 48 tracks per inch (TPI). The tracks are concentric, magnetically reactive strips on the disk surface, invisibly separated by the disk formatting (the disk map the computer uses to store and retrieve data). Double-density disks also store data at 48 TPI, but the number of ferric oxide particles in the disk coating is doubled. Quad-density disks use the

same recording density as the double-density disks, but double the number of tracks to 96 TPI.

**Q.** I have received the reprints of Programming Primer parts 1 & 2 from the March and April 1982 issues. I have tried to run the program in the article "Checkbook," but have not been able to get it to run on my VIC-20. It will not get past line 1000 or 2000 without giving me a SYNTAX ERROR or TYPE MISMATCH. What can I do?

**A.** You have been sabotaged by one of the peculiarities of computing. All BASICS are not created equal. The BASIC that Leon Starr used in that article, and in others he wrote for *Personal Computing*, used a particular format for disk access. Your VIC clearly doesn't recognize the statements he used for getting data to and from the disk.

When *Personal Computing* publishes an article such as the Programming Primer (reprints are no longer available, sorry), we do so in a way we think will provide the best general information to our readers. In this case, we used MicroSoft BASIC, which is in wide use, to illustrate some concepts in computer programming—not to show detailed listings of how a checkbook program is written. We do not expect that every reader will be able to use the listings that appear in our articles, copy them verbatim into his computer, and have the code execute. We do expect, though, that you will be able to take the code we publish, along with the explanation of the thought process behind the code, and generate a workable program from them.

Unfortunately, there's no substitute for work in learning programming. Get out your VIC programmer's manual, find out how to accomplish the functions Starr described in his article, and then proceed to code them in your computer's BASIC dialect. 

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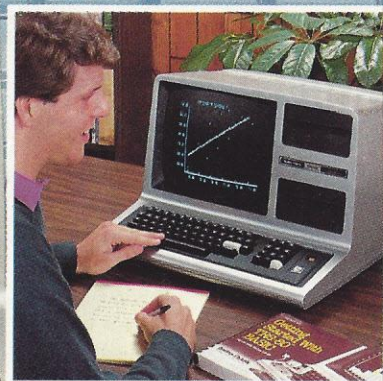
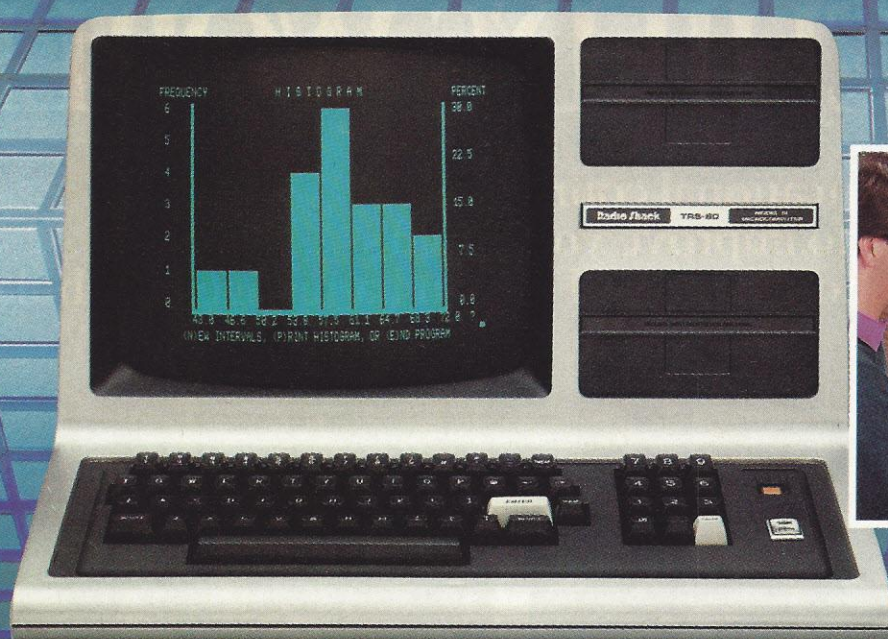


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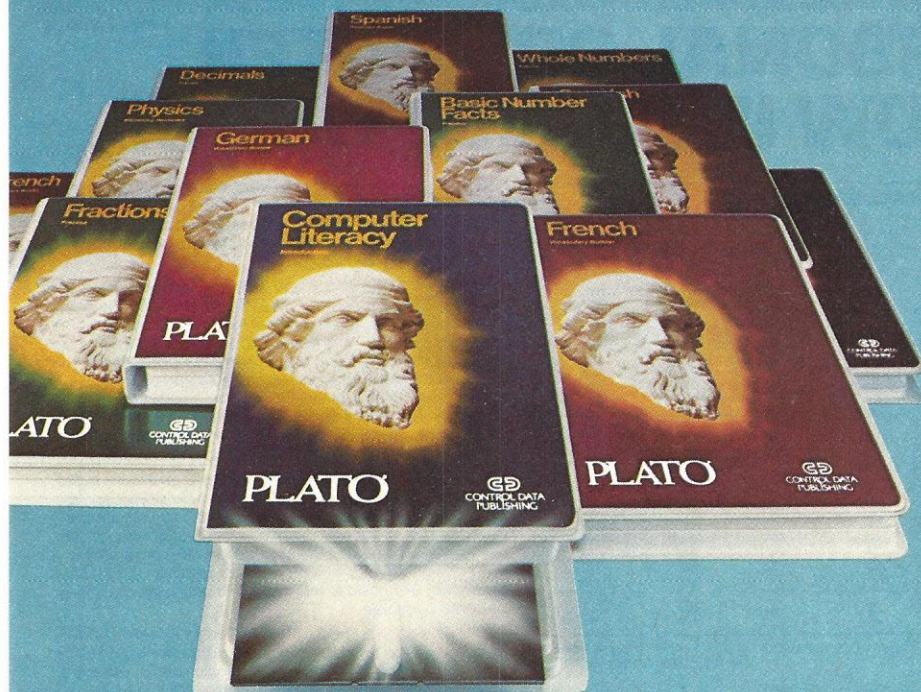
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KEYBOARD FEATURES						
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USER DEFINE FUNCTIONS	10	N/A	4	8	10	NONE
SPECIAL WORD PROCESSING	YES	NO	NO	NO	YES	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	NO	YES	YES	NO	NO
UPPER/LOWER CASE	YES	UPPER ONLY	YES	YES	YES	YES
GAME/AUDIO FEATURES						
SEPARATE CARTRIDGE SLOTS	YES	NO	YES	NO	NO	NO
BUILT-IN JOYSTICK	YES	NO	YES	NO	NO	NO
COLORS	16	15	128	16	9	9
RESOLUTION (PIXELS)	256 x 192	280 x 160	320 x 192	320 x 200	256 x 192	128 x 64
SPRITES	32	N/A	4	8	N/A	N/A
SOUND CHANNELS	3	1	4	3	3	1
OCTAVES PER CHANNEL	8	4	4	9	8	10
A.D.S.R. ENVELOPE	YES	NO	NO	YES	YES	NO
PERIPHERAL SPECIFICATIONS						
CASSETTE	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	1 CHANNEL	1 CHANNEL
AUDIO I/O	YES	NO	YES	NO	NO	NO
BUILT-IN MIC	YES	NO	NO	NO	N/A	NO
DISK DRIVE CAPACITY (LOW PROFILE)	256K	143K	96K	170K	N/A	170K
CP/M® COMPATIBILITY (80 column programs)	YES	NO***	NO	NO****	NO	NO
CP/M® 2.2	YES	NO	NO	NO	NO	NO
CP/M® 3.0	YES	NO	NO	NO	NO	NO

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## A Taste Of The Good Life

Imagine yourself trying to find that one bottle of wine, a 1976 Burgundy that you want to serve with your favorite prime rib, amid the 4000 bottles of wine in your 15-by-15- by 19-foot cellar. That prime rib is sitting on the dinner table getting cold and the guests are getting hungry. Well, Gregory Plunkett experienced this frustration and that's why he decided to computerize his wine list.

Plunkett, who is president of First New England Securities in Boston, Mass., is a serious connoisseur of the juice of the grape. As his inventory of wine grew, Plunkett began to forget which wines he had purchased and, sin of sins, he would forget to drink those that had reached peak perfection.

Plunkett's love for wine began about 20 years ago. "I was having my boss over for a steak dinner, and I went to the liquor store and asked for the very best wine they had," he says. "They sold me a bottle of Chateau d'Yquem. It is a very sweet wine—extraordinary in its own environment, but it's the worst to have with a steak."

After that memorable evening Plunkett decided he'd better learn something about wines. "Perhaps," he muses, "that was the most expensive bottle of wine I ever bought. It's cost me countless hours and bottles of wine since."

Wine, however, was not Plunkett's reason for the purchase of his Apple II personal computer. "I bought it because I was computer illiterate," says Plunkett, "and in addition to my own business, I serve on the board of directors for a company that sells and distributes computers. I also bought it for my children. It was a family Christmas present."

Plunkett soon discovered the system's other capabilities. "I said, 'This is the answer to something I've been trying to figure out. How do I keep control of 300 cases of wine?'"

His first step towards solving his problem was to purchase PFS software from Software Publishing Corp. of Mountain View, Calif. "I decided to read the instructions and see what there was to be done," says Plunkett. "I knew precisely what form I wanted to develop. All it took was the ability to read and the dexterity to push the buttons. They have a book which says, 'Step 1—turn on the computer.' It even shows a picture of the switch. You'd have to be a nitwit not to have it up and running within an hour."

The forms Plunkett created contain quite a bit of information. The top left of the computer form has the name of each wine, inventory (number of boxes, size and number of bottles), and general tasting notes. The top right contains the vintage year, rating (by the International

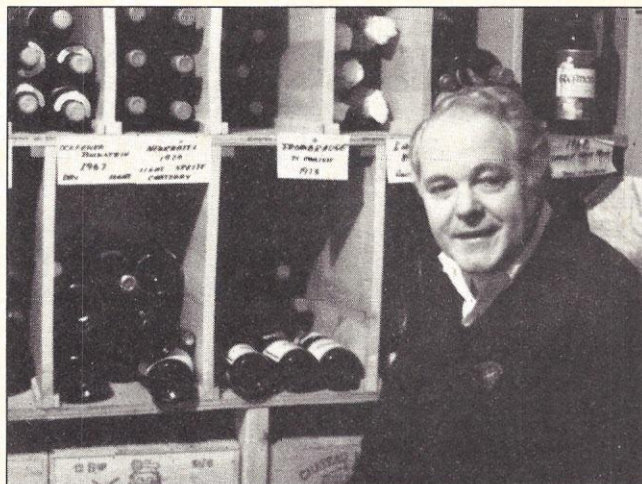
Food and Wine Society), class (dry, sweet, fruity), style (Bordeaux, Burgundy, German, Spanish), and drinkability (the year the wine will reach full maturity). This information is followed by the name of the vendor and the location of the wine in Plunkett's cellar.

"I also indicate the year in which it was bought and the price I paid," says Plunkett. "It makes me feel good to look at the cost versus the market price. After all, I am in the investment business."

Plunkett updates his winery notes about once a year. "I can erase items with ease and flexibility. It saves enormous amounts of time."

And before? "I used to have all kinds of fancy wine books and cellar books—leather bound and cardboard bound. I had them all," says Plunkett. But his collection of wine books no longer holds a treasured position on the bookshelf. "How can you keep wine tasting notes?" he laments. "You either write it in a hurry and then you can't read it later, or else you can't find the book."

Plunkett no longer wastes time looking for books. "The



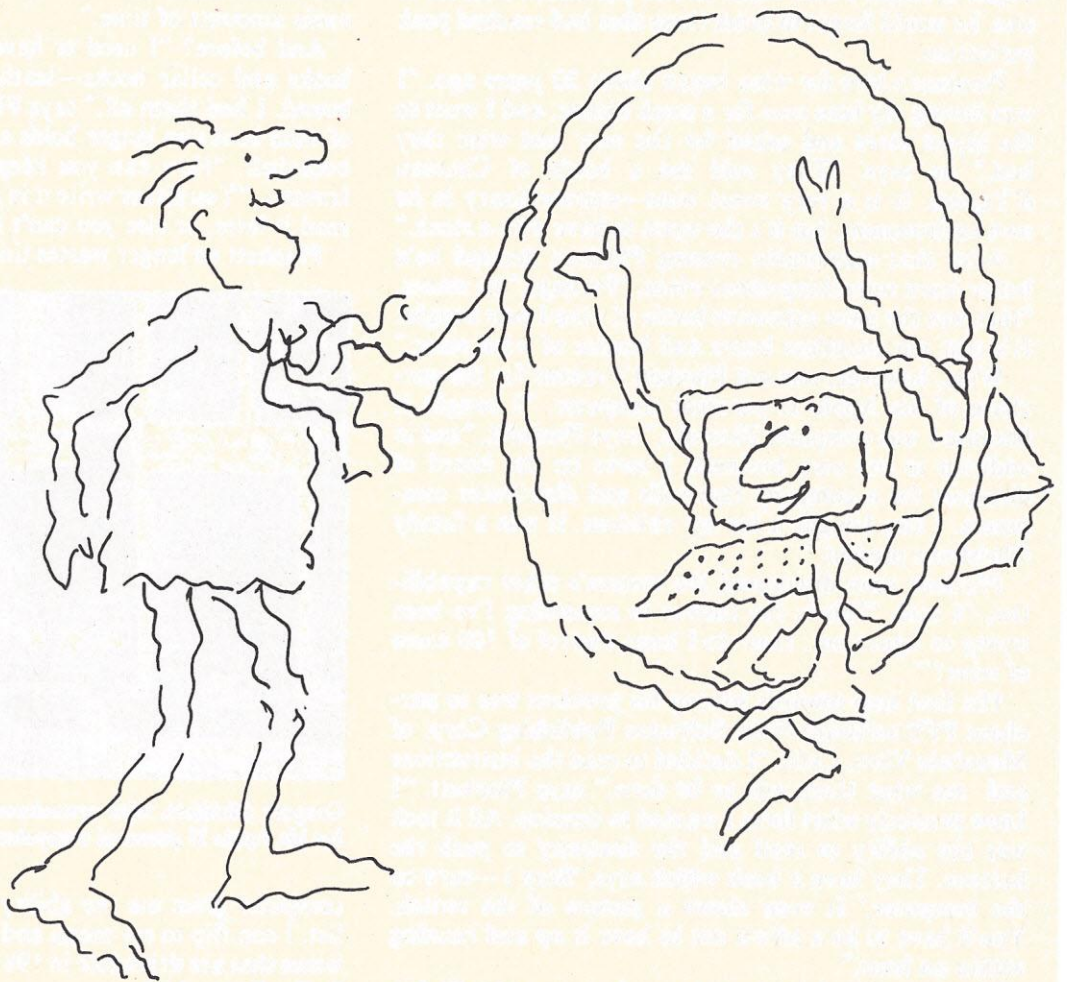
Gregory Plunkett, wine connoisseur, uses a program he devised for his Apple II personal computer to check his home inventory.

computer gives me the ability to recall anything on my list. I can flip to my menu and say that I want to see any wines that are drinkable in 1983, or my bottles of Chateau Lafite-Rothschild.

"For instance" says Plunkett, "I've got some magnums of 1971 Chateau Latour. The computer shows me exactly where they are and I won't have to go crawling around to

*(continued on page 38)*

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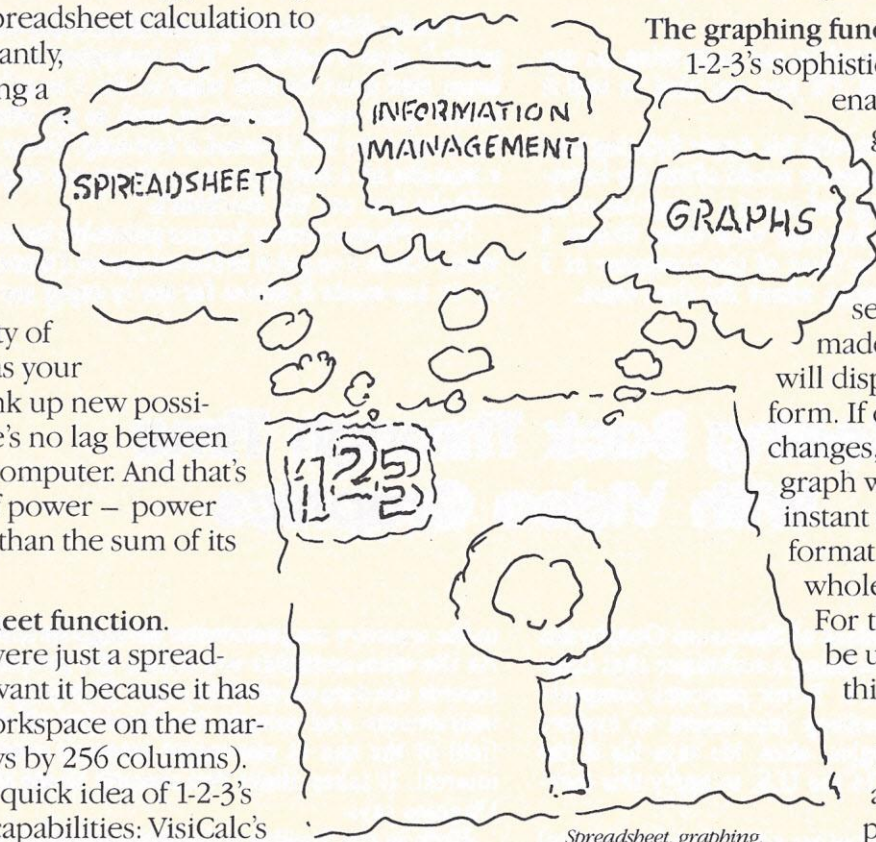
on a limitless variety of topics and extract all or pieces of it for instant spreadsheet analysis. Unheard of before. Specific 1-2-3 information management features include sorting with primary and secondary keys. Retrieval using up to 32 criteria. 1-2-3 performs statistical functions such as mean, count, standard deviation and variance. It can produce histograms on part or all of the data base. 1-2-3 also allows for the maintenance of multiple data bases and multiple criteria.

#### The graphing function.

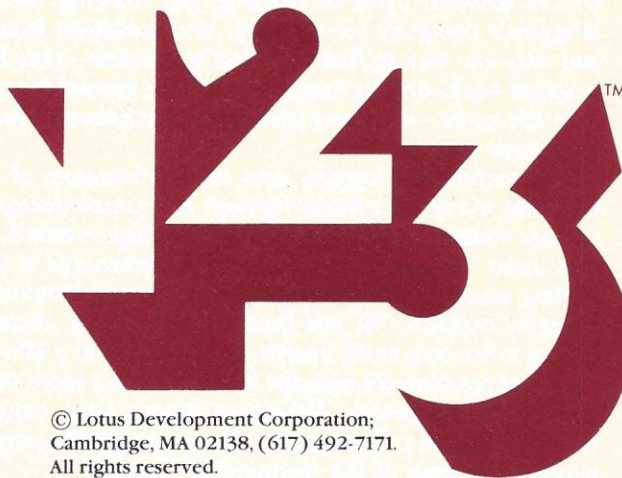
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## PEOPLE IN COMPUTING

(continued from page 35)

look for them. Or, if I wanted to see everything on my west cellar wall, third shelf, I'd just put that in and it would all pop up at me."

Plunkett now spends hours with his Apple figuring how various wine trades and purchases would affect his inventory. "It's like daydreaming and using a computer to do it," he says. "You can go bananas with these things. I truly found myself sitting in front of the computer at 3 o'clock one morning wondering where the time went.

"I really didn't think an individual could control a computer," says Plunkett. "The computer is only another brain that must be told what to do. I wasn't sure that I would know what buttons to push to get what I wanted. And now I do. I'm amazed it's so easy. Every time I made a mistake all I had to do was retrace my steps. It was my mistake and not the machine's."

Now Plunkett never forgets palatable bottles of vintage wine. "Once I've got it in the computer I know I won't lose it. It has made it easier for me to enjoy my wines."

## Seeing Back Through Time With Video Graphics

**R**obert J. Huggins, president of Spectrum Geophysics in Fort Worth, Texas, is using a technique that combines the color graphics of a Terak personal computer with a magnetic remote-sensing instrument to explore and map buried archaeological sites. He says his is the first commercial company in the U.S. to apply this technique to archaeology.

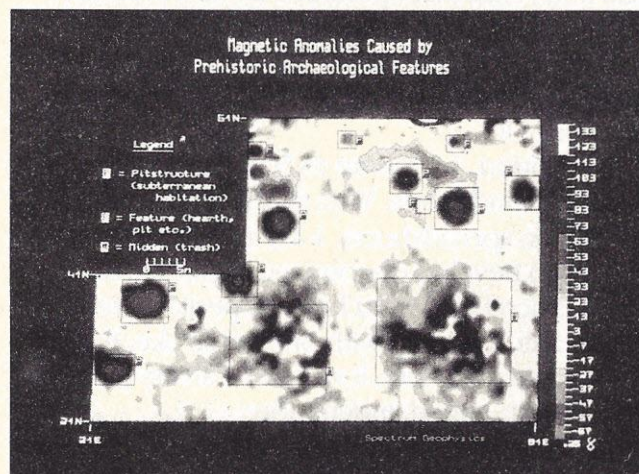
Some ancient villages and other sites of archaeological interest have, over the centuries, been buried under soil or sediment. At times, the only hints of the site's presence may be bone fragments, pot shards, or small objects that have been pushed to the surface by rodents or heaved up by the seasonal cycle of freezing and thawing. Before Huggins's company set up shop, archaeologists usually had only one way to find out what was below—they had to spend weeks driving long poles into the ground to try to map the ruins—a tedious procedure that doesn't always guarantee success.

The technique Huggins uses takes advantage of the fact that many man-made features of an archaeological site are weakly magnetic—even if the culture didn't use iron tools. "Most soils contain a small percentage of iron oxides, usually in the non-magnetic form of hematite," Huggins explains. "If you burn hematite—say, through having a fire on a stone hearth, or firing pots in a kiln—a chemical reaction changes the hematite into a more magnetic form: magnetite. Wherever there's been culture, there are pockets of magnetite that interrupt the normal magnetic pattern of the surrounding terrain."

How Huggins detects and maps that magnetism is where the Terak personal computer comes into play. Actually, Huggins uses two personal computers. The first is a Sharp 1500 8-bit personal computer, which is attached

to the sensitive magnetometer through an RS-232-C port. As the measurements are taken, the personal computer records the data on cassette tapes. Two people operate the instruments and sample the intensity of the magnetic field of the site at one-meter intervals over the area of interest. It takes about two seconds to get each reading, Huggins says.

Back in the Spectrum Geophysics offices at the end of the day, the cassette tapes are loaded directly into the



The color graphics terminal of a Terak personal computer displays the magnetic field of a buried Indian village in Colorado.

Terak 8600 personal computer with color-graphics display. The Terak 8600 computer is composed of a Digital Equipment Corp. LSI 1102 CPU attached to a separate graphics processor, which allows the digital information

to be converted into graphics form. The graphics processor is programmed in Pascal to assign a different color to each magnetic intensity, and colors can be manipulated to display the information in the most effective way. Huggins photographs the high-resolution digital display to obtain a map of the site. The colors reveal the variations in the strength of the site's magnetic field. The computer program corrects the information to remove spurious magnetic signals from local geological features, iron trash such as old beer cans, and nearby modern buildings or power lines. The resulting map, which is printed out for the archaeologist's use, reveals walls of buildings, garbage dumps, ditches, kilns, granary storage areas, ovens, hearths, and the like. "Typically we can see archaeological features as small as one-quarter meter in volume—about a foot across," Huggins declares.

"Our technique is much more cost-effective for archaeologists than the random-sample investigations," Huggins says. "For a typical buried village measuring about 40 meters on a side, our magnetic survey may take one day—with another day required for processing and analysis—and cost about \$2000. The technique of digging holes may take several weeks for a five-person crew—you can compute the costs from there."

The Terak personal computer is also cost-effective for Huggins's own operation. "Before we got the computer we drew the maps by hand. It used to take us three days to get maps from the original information to final form.

Now we can generate a map in about 20 minutes, including drafting compass roses, coordinates, and various labels."

The maps can tell an archaeologist very quickly whether or not a more detailed excavation would be worth the commitment. "By showing archaeologists what's there, our technique gives them more time for actual productive analysis. It lets them focus their resources on a particular site and culture and get the maximum information in the least amount of time." And should the archaeologists not want to dig, the magnetic survey has not disturbed the buried treasure for future generations. Huggins says: "Excavation destroys what's there, but remote sensing techniques leave things intact for future technologies. That's a very important thing for American heritage." There have been cases where Huggins's magnetic technique has revealed unsuspected sites, often in areas where the surface evidence had been removed.

Huggins's company has been contracted by archaeologists to map sites all over the country. "Currently the majority of our work is in Arizona and Colorado. But we've also worked in Washington, Alaska, Canada, Virginia, and the American Southwest." Clearly, Huggins can't lug his Terak graphics personal computer with him into every dusty mountain pass. "Currently we mail the cassette tapes back to the office, but we're in the process of getting a modem running. We should be using the phone lines this spring."

## The Road To Success May Start In Your Garage

**B**ack in the spring of 1980, airline pilot Jody Black went into a computer store to buy a home computer. The salesman there spoke nothing but jargon, rattling on about "bits and bytes and downloading and uploading," and the price—then around \$3000—was more than Black was prepared to spend. Next he visited a discount store to check out the less expensive machines, but when the salesman there spent 10 minutes trying to figure out how to turn on the system, Black gave up.

Black's frustration as a buyer eventually gave him the idea of forming his own company to sell computers through a "multilevel sales approach," with the emphasis on making it easy for the consumer to buy. Multilevel sales is a marketing technique used by direct sales companies such as Shaklee, Amway, and Mary Kay. This tech-

nique provides an opportunity, in theory at least, for everyone involved to make money.

The pitch used by Black's company, which he named Tronics Sales Corporation, goes this way. "Not only should you buy a computer from me to help with your child's education and your family finances, but if you become a distributor, you would have an opportunity to sell computers, and you could recruit other distributors and receive a commission not only on the machines you sell, but on those your distributors sell, and on those sold by the distributors under them, and so on for five levels down."

Black chose to market the Texas Instrument TI 99/4A because it's inexpensive and, he found, easier to sell. He also feels it has a wide range of educational and home



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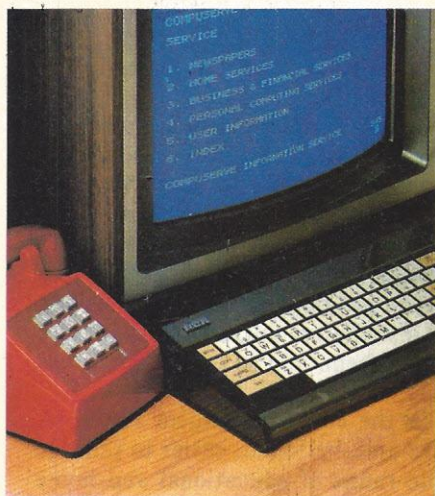
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# RCA

uses. In July 1980, Black called the president of Texas Instruments. He was turned over to the marketing department, which was, at first, skeptical of the plan.

"The idea of direct marketing was new to them, and I think they were a bit afraid of it," Black says. The issue was sent to the legal department for what turned out to be a year of negotiations. These negotiations and the final provisions of the contract are, by agreement between Black and Texas Instruments, to be kept secret. But the arm's length way in which Texas Instruments seems to treat Tronics can be seen in the company's literature that carries the clause, "The relationship between TI and TSC is solely that of buyer and seller."

The contract was finally signed in August 1981. Black, who had by then quit his airline job, took all the cash from his personal savings as well as all he could borrow, purchased as many TI 99/4As and peripherals as he could afford, and stacked them in his garage.

Next Black called up all his airline colleagues and invited them to become distributors. Within a month he had recruited his first: John Bullard, Braniff pilot. And within two months Black sponsored 12 distributors, mostly airline pilots who in turn had sponsored over 200 distributors around the country.

Tronics pays its distributors a commission of 10 percent on anything they sell personally, 5 percent on what the distributors directly below them sell, 3 percent on distributors one step removed, and 2 percent on the next three levels. So if, for example, in a given year you recruit five distributors and sell four computers at about \$400 each, and each of your distributors for five levels down the

pyramid does the same, your income for the year would be \$125,760; and total sales volume to Tronics on your pyramid alone would be \$6,248,800. Although few distributors can be good enough and lucky enough to develop this kind of structure, Black claims that some are making five figures a month; others are moving in that direction.

By the end of 1981 Black decided to stop selling and give full attention to administering his ballooning business. He was still working out of his garage and doing everything himself—from inventory to accounting to shipping. He decided to hire three employees. "At that time," he says, "there were no titles. We all did everything."

In January 1982 Black looked back on his first six months of business and found that he had sold 405 units. Buoyed by this success, he moved into his first office, a small affair with warehouse space. By this time he had a staff of 12. In February he sold 197 more units, moved into a larger office, and began to build a top management staff including the former president and chief financial officer of Pepsi Foods, Inc. In March he sold another 1000 units and moved to a still larger facility.

By year-end 1982 Black had 20,000 distributors selling "multiple thousand" computers a month, and will be moving again shortly. He is developing training facilities around the country and has set up a department to create a complete line of hardware and software for the TI 99/4A. Since he was able to sell every computer that Texas Instruments supplied, he feels the increased production they have promised him is going to increase his business. His 1983 goal is 250,000 units.

## Business Is Flying High Thanks To A Personal Computer

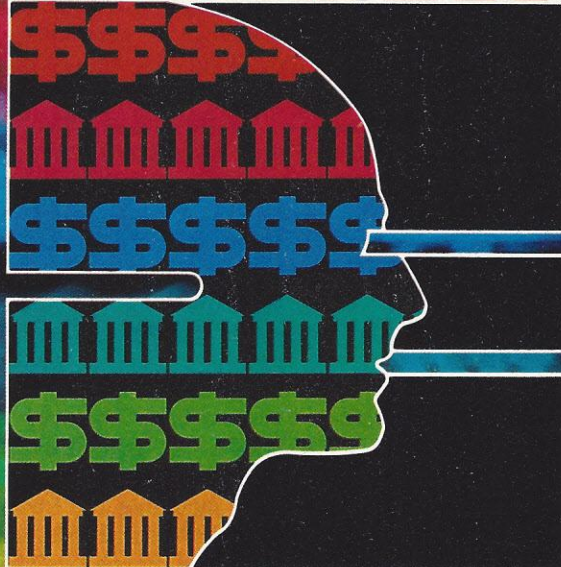
It was the need to do something productive that got William Wilbur of Kittery, Maine, into computing. A former Navy data-processing technician, Wilbur retired in 1971. He soon discovered that retirement is not always the luxury vacation it's cracked up to be. "I'd get up in the morning because I had to get up," Wilbur says. "I didn't have any aims or goals and I was drifting mentally. I said, 'Hey, that's not me.' So I bought the computer. It was a way to force me to start thinking again."

Wilbur bought a Commodore PET (expanded to 32k). He began what he calls "structured mental exercise" by

learning to program his computer in BASIC and playing some games. He taught himself how to write programs with the help of the computer owner's manual and a BASIC workbook.

But computing wasn't the only thing Wilbur did to stimulate his mind. A model airplane enthusiast, he took two years to compile an extensive list of model airplane kits and available blueprints. When he had completed it, Wilbur asked a friend with a similar interest if he'd like to exchange information. When his friend saw what Wilbur had accomplished he said, "Hey, sell this!"

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After thinking over his friend's suggestion, Wilbur decided to market the list and enter the mail-order business. He named the catalog the Miniature Aircraft Directory, or MAD, "because that's what I was to start it," laughs Wilbur.

The amount of information to be included in the catalog was overwhelming. "I had a huge notebook full of stuff," says Wilbur. "One day I said to myself, 'I've got a computer that's supposed to do this.'"

"When I originally bought my PET I had no intention of using it for business," says Wilbur. But there it was—ready to use. So he bought a couple of data-base management programs on tape. "I thought they were horrible. They wouldn't do what I wanted them to do," he says. "The record size was too small."

The data-base programs Wilbur tried were limited to 255 characters per record. "I knew what I wanted to do, so I wrote a program to do it," he says. The data-base management program Wilbur designed stores from 300 to 380 characters per record.

Wilbur named his program DATA BANK. He has also created a program named MAIL BANK. "I started out with a menu, or command table, and then set up modules," he says. "It's all pretty straightforward. I'm not one of those 'whizz-bang' programmers. I just plod through."

"Basically," says Wilbur, "I assigned line number blocks to each function and then I filled in the blocks." The whole process of putting the catalog on computer took only a couple of weeks.

To print his catalog, Wilbur takes the printout from his Commodore 2022 printer to a nearby quick-copy establishment. He sends out 50 copies at a time, with the

aid of his MAIL BANK program, and he conveniently updates the catalog before each mailing.

The finished product is a 100-page printout which lists 1700 items and sells for \$10. "It lists model plane specifications, prices, and where to get the planes," says Wilbur. "The planes in the directory are typically in the 8- to 10-foot category and weigh from 18 to 40 pounds. The prices of the models range from \$70 to \$700."

Wilbur is satisfied with his computer setup—except for one thing. "I wish I had a disk drive," he laments. "I'm sitting here looking at 13 boxes of cassettes." Right now the data base is stored on 30 cassette tapes.

"I would love to be able to make a catalog of all the scale models on the market," says Wilbur, "but there are over 3000 of them. Until I go to disk I'm not going to even attempt that. It's just not worth the effort. Actually, for what I'm doing I should have a mainframe with about 200k of RAM."

Besides the computerized catalog, Wilbur also uses his Commodore PET for tracking his business. "I keep track of all the people who have purchased from me and when they made the purchases," he says. Business is going well. This year Wilbur estimates he'll be mailing out almost 200 copies of the directory—double what he sent out last year.

William Wilbur is a busy man, but his computer has given him the time to keep up with his other interests. He has written another program—a general-ledger package which "will also do your checkbook"—he belongs to several miniature airplane clubs and organizations, and in his spare time he gives lessons to people who want to learn to use a personal computer.

## Banking On A Competitive Edge In The Marketplace

**S**uccess in an industry as regulated as banking rests on finding new and innovative ways to serve customers. When your interest rates are the same as everyone else's, and your customers have all the toasters and dinnerware they need, there is little left to attract new clients. Last summer, a team at Shawmut Bank of Boston began working on a project to make banking more convenient by giving customers the opportunity to make transactions by personal computer.

According to Janet Pruitt, a member of that team and the bank's vice president of marketing, the idea for the project originally came from John P. Hamill, the bank's president. "He realized the growing popularity of computers and wanted us to take advantage of it," Pruitt says. Since people are using personal computers to balance their checkbooks, follow their stocks, and budget their household money, why not give them the opportunity to do their banking on personal computers as well?

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To be an effective banking tool, the home computer would have to act much like the "point-of-sale" terminals that stand in bank lobbies and supermarkets and allow people to access their accounts to make payments, transfer funds, or determine the statuses of their accounts.

The first step in developing the system was to find a way to give customers access to the bank's customer files. The project team decided it could write programs and purchase hardware, allowing customers to access part of the bank's data base using modems. But this was quickly ruled out because the bank felt it was too expensive and too great a commitment for an experimental project.

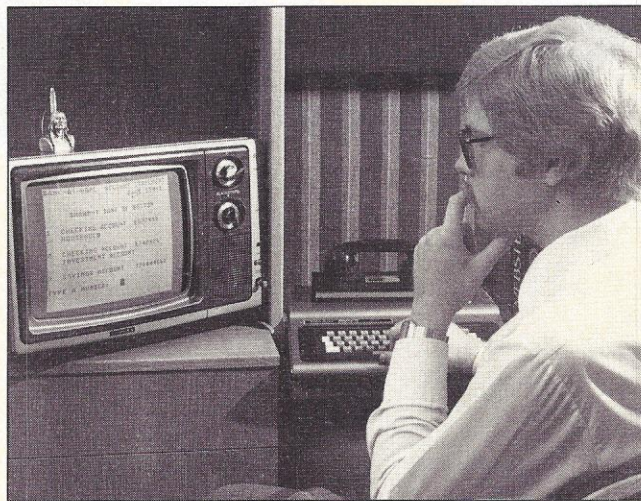
A few years ago, the whole idea would probably have been shelved because of the cost. But the bank had an alternative: a data-base networking system. The team checked out the possibility of using CompuServe's communication network service. "CompuServe was already in place and ready to use," Pruitt says, "and it was relatively inexpensive." Customers call in to CompuServe and are then switched out to the bank files through the service.

CompuServe solved the networking problem, but finding software to control customer transactions and queries was more difficult. "We spent a good deal of time searching for software and checking to see how expensive it would be to develop our own," says Pruitt. "Luckily, we found that a bank in Knoxville, Tenn., United American, had already developed software for this purpose in conjunction with a software company called Financial Interstate Services. Although United American didn't yet have an ongoing bank-by-computer service, it was developing the software for future use and franchising it to help recoup expenses."

Once the details had been sorted out, the bank had to find users for the system. The Shawmut team decided to use 100 volunteers gathered through a newspaper advertisement. They paid these volunteers the cost of a subscription to CompuServe and also absorbed any connect-time cost related to the project. Once the service leaves the experimental stage, however, customers will probably have to pay their own CompuServe fees.

The system was up and running by the beginning of last

October. At present it provides three services: a bank news and information service that lets customers know about new types of accounts, current interest rates, and locations of branches; an account statement that has up-to-the-minute information about account status, including which checks have cleared; and a bill-paying service that lets users type in the name of the merchant to be paid, how much to send, and when to send it.



**Shawmut Bank's home banking service gives customers access to their checking, savings, and line-of-credit accounts.**

The program is still in the testing process and is being monitored in three ways, Pruitt explains. The first test is a questionnaire filled out by customers at various times during the project. The second indicator is the number of times the service is used by customers each month. And the third gauge is the number of bills paid each month with the aid of the computer.

"The questionnaire will help us determine whether customers want this type of service," Pruitt says. "The second and third considerations will help us decide how much we would have to charge to make it cost effective. We are basically looking to break even."

## Abracadabra!

**T**he magician in his black cape and top hat stands on the stage. After some conventional magic—card tricks, cups and balls, linking rings, and silk effects—a personal computer with a color monitor is wheeled out

from behind a curtain. A member of the audience is chosen to sit at the computer and think of a card, then press the space key. Lights and colors flash on the monitor

*(continued on page 51)*

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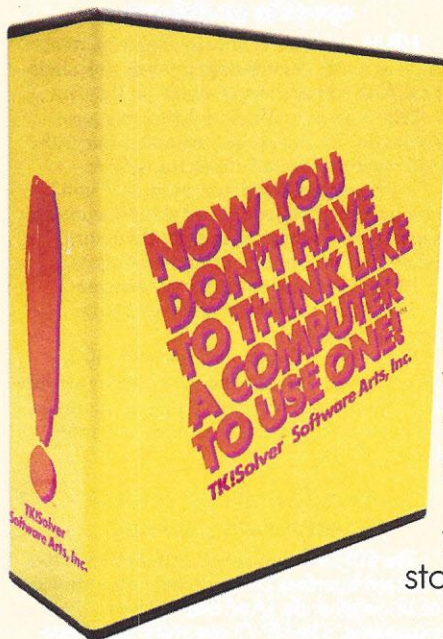
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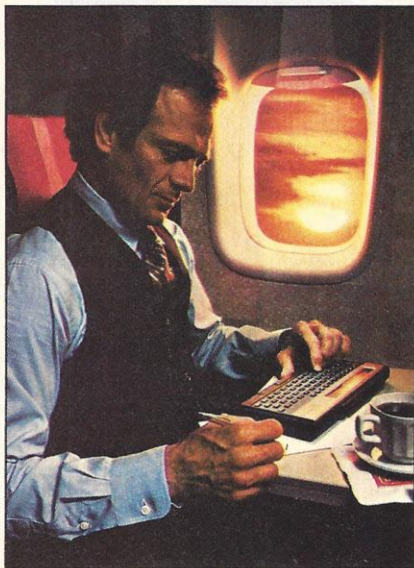
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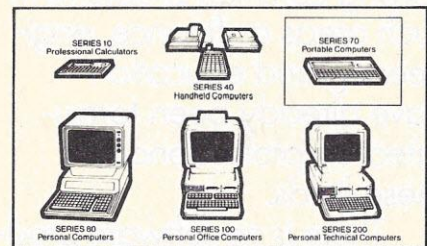
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(continued from page 45)

screen. Eerie music floats across the room from the monitor. Soon a faint shape appears on the screen. When the shape becomes clearer, you realize that it's a picture of the card that the audience volunteer chose.

The familiar question "How did *he* do that?" in this instance could be changed to "How did *it* do that?" Well, how does a computer do anything? It's programmed, and the programmer in this case is magician Kevin Gough.

Computers are Gough's second love. His first is magic, which he performs at parties and shows in his hometown of Wappinger Falls, N.Y. He has been involved in magic since 1976, when he saw Doug Henning's "Magic Show" on Broadway at the age of 15. His second love began two years ago when he bought his Commodore VIC-20 personal computer.

A year ago he began to think of ways to join his two interests, so he hatched the idea of performing computer magic. Since there is no software that does magic tricks, Gough had to write his own.

"Inventing tricks and writing programs are very similar," he says. "In both cases you have to follow a very strict string of logic. And in both cases the viewer seeing the final product has no idea how it is done."

And Gough isn't going to tell them. After all, no magician gives away the "tricks of his trade." The card-trick software described above, a program called Pic-a-Card, was recently bought by Briley Software in Livermore, Calif., and will be marketed soon for \$14.95. But, Gough admits, although the effect will be the same, the method for working the trick in the program that will be on the market is different from the one he uses in his show. "I'm not yet ready to give up using this trick," he says.

Another computer trick that Gough uses in his show is a basic "guess the number" trick—but it's not so basic. The VIC-20's printer outputs the name of a color on a blank piece of paper. The printer is covered so no one can

see the predicted color. An audience volunteer is then prompted by the computer to think of a number between one and eight. The screen shows the eight numbers with different names of colors spelled out next to them. Blue is written in blue, red in red, etc. If the audience member picks three, the color next to three is purple. When the volunteer looks at the previously printed piece of paper, he finds that it says "Your color is purple."

In addition to magic software, Gough has written programs that range from relatively simple—an infinity calendar that tells what day of the week any date in the future will fall on—to complex—a word-processing program that he writes his show scripts with.

Gough's next project will be a large illusion that he hopes to perform on television. The effect begins with a member of the audience coming on stage. He stands on a raised platform so the audience can see that there is no trap door underneath. A curtain is lowered around the volunteer, and a second curtain is lowered across the stage. In a few seconds, the curtains are raised to reveal that the spectator has been magically transported from behind one curtain to behind the other.

The effect is not new. What is new is that everything, including the raising and lowering of the curtains, will be accomplished by a computer that stands in the middle of the stage. "I'll have my computer right there on stage, and I'll tell my audience that it is performing the trick," he says, believing that it will add to the entertainment.

"Magic is entertaining for two reasons," Gough says. "First because of the sense of awe it inspires in the audience. Even adult audiences suspend their disbelief and subconsciously believe the magic is real. The second reason is that it stimulates the intellect. The audience tries to figure out how a trick is done. Computers seem to have the same effect on most people. So my computer heightens my audiences' experience and the entertainment value of my magic."

## A Good Place To Turn And Learn

**K**eeping ahead of the next guy is the name of the game, and in this age of technological advancement it's difficult to keep up—unless you have some kind of public resource to turn to for help. In most communities, the library is the traditional place where people go to research, explore, and question. The Maurice M. Pine Free

Public Library in Fair Lawn, N.J. is answering the public call for information by providing the use of a personal computer as a service to that community's residents.

Henry Thomas, library director, was one of the first to recognize the public's need to know about the personal computer revolution. But he knew that if he was to get

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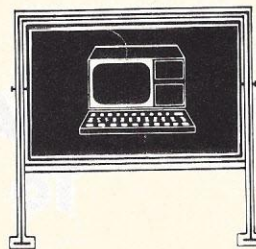
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even one personal computer, it would have to be purchased with surplus library funds because the borough couldn't afford such "frills." So Thomas and his colleagues kept close tabs on library expenses and on January 20, 1983, their efforts were rewarded when their newly purchased Apple II was installed.

The computer is for public use only, says Thomas. Its intent is "to educate the public by giving them hands-on

"stamped his foot and began to chuckle aloud with his [apparent] success." And of course the reverse sometimes occurs, adds Thomas, in which case the chuckles are replaced by scowls.

Sometimes the motivation to try the personal computer is business oriented. A local dentist used the library's Apple II to determine whether computing could really help him in his practice. The library's computer allowed him to get acquainted with computing at his own pace, free from the pressure of retail sales outlets. After his first computing experience, he bounded into Thomas's office and said, "I'm going to go out now and buy one just like yours!"

The computer's users include people who aren't necessarily considering career opportunities, but just want to use the computer. One second-grader, who comes in regularly with her mother, uses Apple Zoo educational software. Now the mother, seeing the child's zeal, also wants to get into the act. She would like to develop some new educational programs for kids. The library, incidentally, provides free disks for its computer users, and plans to increase the size of its disk library by making copies of the homemade programs available for community use.

In addition to the Apple Zoo software, the Fair Lawn library has word-processing and tax-preparation software, a typing tutor, and Apple LOGO. The already sizable library of computer books has also been increased by 150 titles, since the introduction of the Apple II. Through these books, Thomas says, borrowers can become more familiar with general and specific computing vocabulary and principles, thus making their hands-on time more productive.

The Apple has become one of the library's hottest properties. "It's in use from nine in the morning until nine at night, five days a week, and from nine to five on the weekends," says Thomas. "On the first day [the computer was installed] we didn't set up any time limitations. We had absolutely no way of anticipating the tremendous response. The rush was so great we were forced to institute a reserved time system." The present schedule allows for one hour of reserved time per person, per day.

If the Apple II's popularity continues, the library will soon need more computers. "I can see the need for at least three more computers—one specifically for the children's room—as soon as we can afford them," Thomas says. "I think a computer in the children's room would almost eliminate the need for some other equipment we have, and it would be used more. The kids find the Apple II easy to use, and there are so many programs available for it."

Buoyed by the overwhelming response to the Apple II, Thomas is now looking toward the future. He anticipates more public support for this project—support which hopefully will result in more computers for the community.



photo by Ellen S. Parris, courtesy of The Shopper Newspapers, Fair Lawn, N.J.

**Library director Henry Thomas instructs Fair Lawn, N.J. residents Rhoda Rubin and Marcia Polster on the Apple II.**

experience." And for many residents this computing experience is their only exposure to the ever-changing world of high technology.

People use the library's computer for a variety of reasons, not the least of which is curiosity. The library has made a teaching cassette available for users, complete with earphones, so novices can try the Apple with a step-by-step tutorial program. One elderly gentleman observed by Thomas was engrossed in his lesson when, suddenly, he

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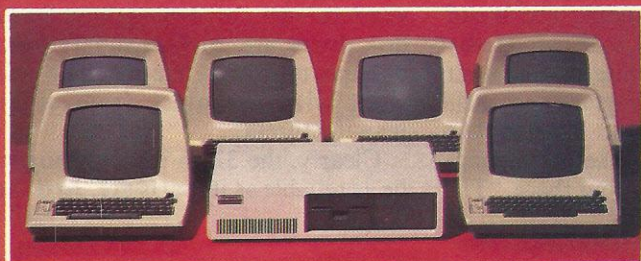


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Resident Cache Buffer Hard Disk Storage	5M/10M	—	?
<b>OPTIONAL OPERATING SYSTEMS (Supported by Company)<sup>2</sup></b>			
MS-DOS (PC-DOS)	Yes	Yes	?
CP/M 86	Yes	Yes	?
MP/M 86	Yes	—	?
OASIS-16	Yes	—	?
XENIX	Soon	—	?
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<sup>1</sup>For comparison purposes, typical professional configurations consist of 16-Bit 8088 Processor, 128K RAM with Parity, Dual 320K 5-inch Floppies, DMA and Interrupt Controller, Dual RS-232 Serial Ports, Centronics Parallel Port and Dumb Computer Terminal or Equivalent.

<sup>2</sup>Columbia Data Products also supports CP/M 80\* with an optionally available Z-80 CP/M Expansion Board.

\*As advertised in BYTE Magazine, August 1982.



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# Building A Fortune Bit By Bit

Creating a personal computer weds the fine skill of a surgeon with the efficiency of an assembly line—adding brains to brawn

by Michael Rogers, Senior Editor

It's late afternoon in a factory just north of California's Silicon Valley. Inside, the assembly line is moving, but the process seems leisurely and is nearly silent. The machine being assembled is a Fortune 32:16 personal computer. It's a sophisticated piece of hardware that, at a cost of \$7000 or so, is as powerful as the room-filling minicomputers of a decade ago, but will ultimately perch on one corner of an executive's desk.

What's being created here is a bit of America's industrial future: unparalleled high technology. And Henry Ford himself would immediately recognize the assembly-line concept. But, if armed with a stopwatch, he might be a bit baffled. From the beginning of the assembly line to the finished product—a pricey piece of highly evolved technology—the production process takes just 22 minutes.

Nevertheless, the figure is deceptive. For far more than meets the eye goes into the assembly of this—or any—computer. Fortune Systems is neither the smallest nor the largest personal-computer manufacturer around, but it is probably as representative of the process as one can find in such a new and rapidly evolving field. The Fortune machine

represents a vast array of skills and a broad set of locations, ranging from the bleak industrial flatlands east of Silicon Valley to an isolated mountain enclave of redwoods and pine trees 20 minutes from the Pacific.

The Fortune factory is located in a former Coca-Cola bottling plant—a

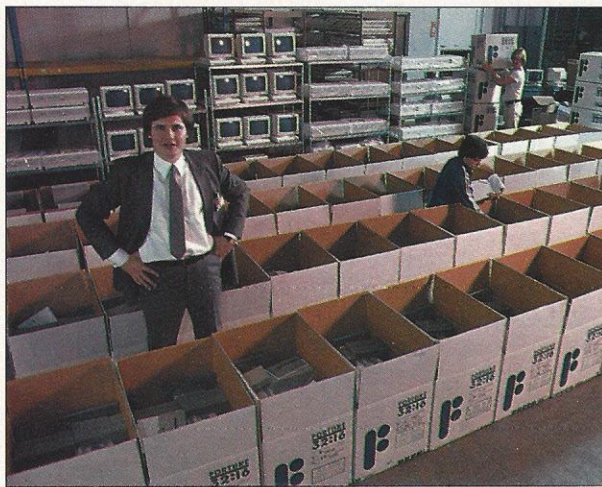
whole point," he says, "is two questions: When they open the box, will it work the first time they plug it in? And then, how reliable will it be? We figure," Rotow says, "that if you don't have time to build in quality the first time then you won't have time to do it the second." That time, as we

will see, is vastly more than the 22 minutes actually clocked on the assembly line.

The Fortune 32:16, like other personal computers, is made up of many components and subassemblies. Rotow says there are probably several hundred suppliers in all, ranging from purveyors of nuts and bolts to manufacturers of essential components such as disk drives. Components in the latter category are so essential they're called "show-stoppers," which is what would happen if the source of components dried up for any reason. To circumvent that possibility, Fortune has

designed its computer so that major subassemblies can come from various vendors—i.e., if 5-megabyte hard disk drives are in short supply from one manufacturer, the machine will work with the units from other manufacturers.

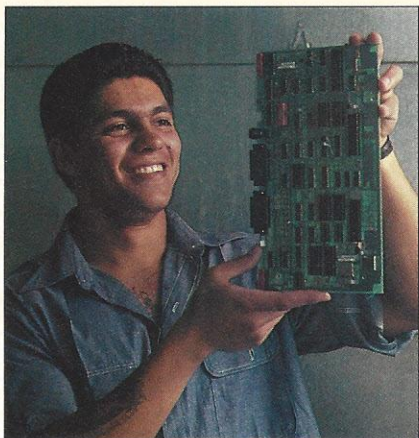
Clearly, the 32:16 is only going to be as reliable as its parts are. And the



Dimitri Rotow, product marketing manager, surrounded by a number of newly tested Fortune 32:16s ready for shipping.

photos by Lee Youngblood

127,000 square foot complex in Belmont, south of San Francisco. In back of the big building are broad loading docks, and stacked nearby are the blue and white cartons that will bear finished Fortunes to their purchasers. Dimitri Rotow, the youthful Fortune marketing manager, begins his factory tour there. "The



parts are diverse. On the receiving dock there are tall, rolling metal racks of floppy and hard disk drives, arranged on foam—like racks of donuts in a bakery. Beyond that are boxes of completed green circuit boards, each wrapped in plastic, stacked high on wooden pallets. Beside that are rows of empty 32:16 cases, still in the uniform dull gray of

injection-molded plastic, their interiors sprayed with the black, electrically conductive material that acts like a metal chassis in meeting FCC radio interference standards. And directly beyond the plastic cases is the elaborate testing facility through which most of the components pass.

Equipment for the testing process fills several thousand square feet of plant space. In one area, for example, shoe-box size power supplies, manufactured by Zenith, are being tested with the assistance of a small DEC computer. Each supply goes into a small blue cabinet that heats the unit to operating temperature almost instantly and then applies filtered line current. The supply's performance is measured against specific actions that involve, says Rotow, "excruciating detail."

Similar scrutiny is applied to some mechanical parts by means of a huge slab of granite. In the Fortune plant, a sheet of the rock four by five feet,

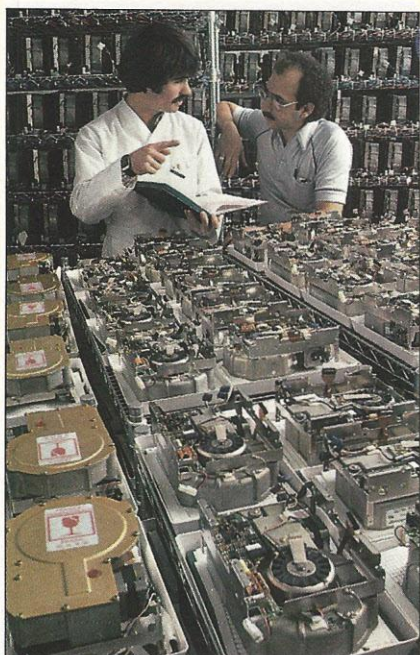


**Left:** The completed Fortune 32:16 motherboard contains five layers of electrical circuitry. **Above:** Integrated circuits are inserted into boards resting on pads of conductive foam. **Below:** For soldering, the circuit boards are suspended, just touching the surface of the molten metal.

and eight inches thick is used as a vibration-proof platform for measuring tolerances within, say, one ten-thousandth of an inch.

The Fortune motherboard, which holds the 68000 CPU chip and the memory chips, is not made in the For-





Above: Sal Scuderi (right), Seagate's director of corporate quality, reviews the progress of a batch of hard disk drives. Right: The completed Fortune 32:16. Below: The open hearts of hard disk drives are assembled in "clean rooms," where even beards require hair nets.

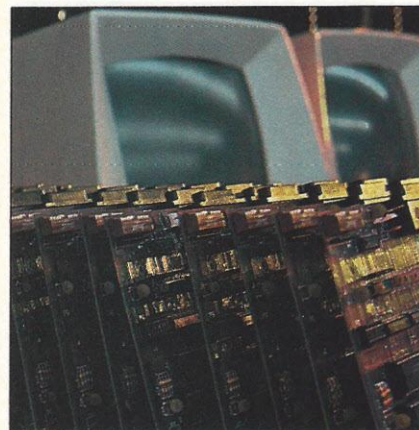
tune plant. Indeed, it's increasingly common for computer firms to farm out the actual board assembly—either to other companies in the area (there are probably 100 or so "board stuffers" in the San Francisco Bay region alone) or to foreign plants,

## ADVANCED

usually in Mexico or the Far East.

Fortune decided not to go so far afield. Their boards are assembled just across the Bay, at a place called Advanced Technical Services—an industrial building in Fremont, located between a shuttered General Motors plant to the north and a newly idle Ford plant to the south.

One's first impression of ATS's main assembly room is that it's been invaded by a horde of mechanical crickets. The air is filled with a constant soft clicking generated by one of the final assembly stages, when the leads of each component soldered in the printed circuit board are clipped off by hand. Fifteen people, mostly women, sit on chairs, clipping leads, facing a wall covered with illustrated instructions in four languages. As with much of the assembly process, the lead clipping can be automated, but for high precision work or military specifications, it's still done by hand.



ATS's role begins, says ATS president Huey Lee, when the individual components—IC chips, resistors, capacitors, and printed circuit boards—arrive on the shipping dock. In the case of the Fortune 32:16, the 68000 microprocessor chips have already been to the Fortune factory for initial testing. Besides improving reliability, this means that the chips can be



*An unusual object  
turns out to be fairly  
common in these factories:  
a slab of granite.*

soldered directly into the circuit boards (with some confidence that they won't have to be replaced) instead of being inserted into sockets. Sockets allow easy replacement, but can also create problems if ICs don't fit tightly.

"It's like a Heathkit," Lee says, "only we start with thousands of components at a time." The parts are sorted according to projects and placed in small boxes that are sent out into the main assembly room. There workers clip and shape the wire leads for insertion into the printed circuit boards.

Then, in the center of the big room, the painstaking handwork begins. Five rows of long tables run down the center of the open factory. Each table is covered with a layer of electrically conductive foam, grounded to an eight-foot copper rod buried in the soil beneath the building, all to prevent buildup of the static electrical charges that can destroy delicate ICs in an instant.

Three hundred people work at ATS, in shifts running from 6:30 a.m. to midnight. At any one time, only 15 or 20 are involved in the actual insertion of components; it's a leisurely looking process, wherein the workers aren't assigned to given stations, but rather walk from one table to another. During the course of assembly, each board is inspected a total of nine times; at this early stage, the inspectors verify that the correct components are being inserted in the proper circuit board positions.

Someday, the shaping of components and their insertion into the boards will be automated, in the Fortune assembly process as well as most other personal-computer lines. The elaborate five-layer Fortune motherboard has been designed to facilitate that changeover. The robotic approach offers powerful advantages: By hand, 11 components are inserted each minute; by machine, it's one per second.

Once the components are in the

boards and have been inspected, the most dramatic part of the ATS operation takes place: soldering. It's a time-consuming process—the intricate Fortune motherboards, for example, would take hours to solder by hand. But at ATS, the soldering is done in less than a minute.

The German-made soldering machine is two feet wide and 10 feet long—essentially, a long trough filled with 300 pounds of molten solder—a shimmering, mirror-like pond maintained at 440 degrees Fahrenheit. Each circuit board is held by delicate mechanical fingers at the proper height to skim the surface of the molten metal. When the board lifts up at the end of its run, the solder sticks to the exposed copper traces on the bottom. A small skimmer is dragged across the solder after each board, to restore the glistening surface to its pristine state. When the solder itself has become contaminated with repeated use, it's cooled, sold as scrap, and ends up recycled in such forms as the leading in stained glass windows.

The solder on the boards solidifies very quickly, and then each unit goes directly into a washing machine—another elaborate mechanical creation about 15 feet long and distinctly reminiscent of a miniature carwash.

Once washed, the protruding leads on the boards are clipped by the line of employees that produces the constant cricket imitation. Then come final touches—jumpers, for example (wires that connect points on top of the board), are soldered in place and glued down. Final touch-up involves cleaning, and making sure that the boards are "esthetically pleasing," in Lee's words.

At ATS, the final step before the Fortune boards are wrapped in plastic and boxed for their trip across the Bay is additional testing.

Each motherboard is subjected to the "bed of nails"—a device the size of a big Xerox machine that draws the circuit board down onto a complex pattern of little nails, to make

electrical contact and allow simultaneous testing of many circuits. The bed-of-nails machine costs upward of \$250,000, and each type of circuit board tested requires its own fixture, an elaborately hand-wired \$2500 matrix to connect it to the machine.

These computerized testing devices simplify a very complex process. The machines test not only for basic electrical values like resistance and capacitance, but also for the entire logical response of chips and associated circuitry. What goes on during the brief test procedure is exceedingly complicated; what the worker sees on the test machine's video screen, however, is simpler than most spreadsheet programs.

The screen reads "TEST," "FAIL," and even displays a picture of the particular integrated circuit that it's testing—illustrating, one by one, to which pin the worker should touch a logic probe next. At the end of the test, the machine prints out a full description of the circuit board's performance, with failure modes carefully outlined—"CORRECT VALUE: 100 PICO FARADS; TOLERANCE: 90-110; ACTUAL: 23.6."

"It's a red light/green light system," Lee says. "The worker doesn't really need to know a great deal."

### **Hard disk driving**

The most delicate and labor intensive portion of the Fortune 32:16 is the hard disk drive, which represents a significant proportion of the factory's output. As with other components, Fortune has many hard-disk suppliers. One major source is Seagate Technology, located in Scotts Valley, 30 minutes from the heart of Silicon Valley—a scatter of modern redwood buildings surrounded by green hills and pine forests.

Hard disk drives are devices that operate in micro-inches and nanoseconds—the magnetic head that reads the information stored in the drive flies only 10 micro-inches over

*The first stop in the testing process is what Seagate employees call "the company sauna."*

the surface of the disk, which is spinning at 3600 RPM. Precision is crucial—and so is cleanliness, for the tiniest bit of dust on the spinning disk surface can cause a "head crash" that, in its own microscopic way, is a collision equal to a speeding 747 smashing into the Washington Monument. Considering the precision required, in fact, it's remarkable that the Seagate plant can turn out 1200 of these electromechanical marvels a day—and at a cost of only \$800 or so to the computer manufacturers who install hard disks in their systems.

Seagate's assembly process, like ATS's, begins with inspections. Every part is routed through a huge degreaser before it goes past the loading dock, and then the next stop is testing. In one inspection room, for example, an employee examines metal pieces little bigger than toothpicks, under a microscope. These are the bands that move the magnetic heads inside the drives, and each one is studied carefully. A steady stream goes into a rejected pile, as the worker notes each defect.

Every motor is tested. The controller circuit boards, which are assembled in Singapore and tested there, are examined once again. Racks outside the inspection rooms contain boxes of raw parts—from Mexico, Korea, various points in the U.S.—and just next to those racks is a tall cage full of rejected material headed back to the manufacturers.

The Seagate facility has a variety of small computers and high-precision measuring devices, such as chemical kits that check the composition of various steel and aluminum components. One machine examines ball bearings by projecting their magnified images on a round, backlit screen with cross hairs that measure for tolerance to within 50 micro-inches. Two oven-size chambers, computer controlled, cycle through a broad range of temperatures to test both individual components and finished disk drives for thermal stress.

After all the testing, the assembly begins. The hearts of Seagate hard disk drives are assembled in "clean rooms" and "gray rooms." In the gray rooms, the workers wear white lab coats and hairnets. In the clean rooms, called Class 100, the air is filtered so carefully that in each cubic foot of air there are no more than 100 particles, and none of those is larger than half a micron. To provide yet additional cleanliness within the clean rooms, the open hearts of the drives are handled in laminar flow hoods—big cabinets in which the air is constantly kept moving upward to prevent contamination—the same arrangement that biological research laboratories use to contain dangerous bacteria and viruses.

### ***Signed, sealed, and tested***

The final assembly takes place in another Class 100 room. The unit is hermetically sealed, and then a final visual test takes place—a worker pulls a small red plug on the drive's surface and inserts a narrow optical tube to search for any loose particles that may remain within the housing.

From there, the drive begins its last round of testing. The first stop in that process is what Seagate employees call "the company sauna." In a small, red-lit room, maintained at 110 to 120 degrees, man-high racks of newly completed drives, all intertwined with temporary power harnesses, are "exercised" for five days—thousands of drives sitting in the heat, clicking and humming and spinning away without respite. "This," says Sal Scuderi, director of corporate quality, "weeds out the infant mortality."

If they pass the five-day sweat test, the drives, in batches of 50, undergo a two-hour, computer-controlled examination. The drives are wired to long blue consoles that take them through a complex set of tasks, recording and transferring data, and ultimately producing a printout for each drive that describes its performance characteristics in precise detail;

the printout, if the drive has passed, is shipped along with it.

Finally, a few more sets of tests are performed, including one set that will be duplicated by whatever computer plant receives the drives. Each drive has its "cork" pulled again, for another look inside for stray particles. A few drives are permanently removed from the production line, for an ongoing reliability and life test conducted year-round at the plant. In the room devoted to that endeavor, some 100 drives are running constantly to determine their MTBF—mean time between failures. That small, cool room contains some drives that have been running constantly for more than a year and a half.

When the separate components, like the motherboard made at ATS or the Seagate disk drives, arrive at the Fortune plant in Belmont, they are tested once again. In fact, in both cases, they're tested with much the same equipment as the original manufacturers used. This testing may begin to sound obsessive, but it is a crucial part of successful personal-computer production. And it has a distinct element of self-interest for the manufacturer as well. Fortune's Dimitri Rotow illustrates this point by quoting what he calls "the rule of tens." At the chip level, if you catch a defect, it only costs a nickel to fix. Once the chip is on a board, it costs 50 cents to remedy. In a completed system, it's \$5. And if the computer gets out into the field, the repair costs at least \$50.

Only when Fortune's component testing is finished does the 22-minute assembly process begin. Only a handful of workers actually put the 32:16 computers together. The process involves some use of pneumatic nut drivers, a soldering pencil here and there—and quite a bit more testing along the way.

The completed 32:16 then goes to one corner of the Fortune factory, to a set of tall metal racks where it joins

*(continued on page 163)*

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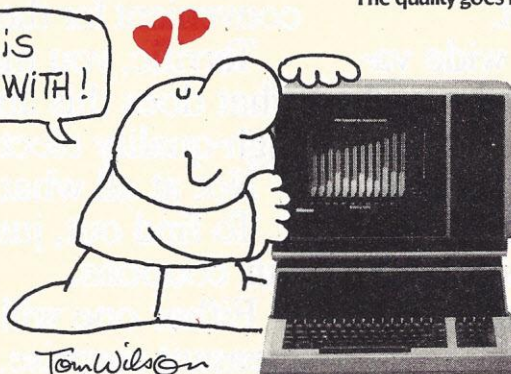
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CIRCLE 27

# What's In A Game?

Have you ever wondered why some people sit for hours at their computers playing what seem to be silly games? Well, there is reason to think those games aren't quite as silly as they seem

by David Gabel, Senior Editor

**T**he town council president is a big man whose weatherbeaten face, at least in my part of the country, clearly identifies him as a farmer. He is a man known for his dry humor—and, as his neighbors put it—damn good horse sense.

"Those places are no good for our kids," he is saying to a packed town meeting house. "Arcades are what pool halls were in my time. They attract kids who aren't old enough to know any better. The kids hang around spending money they should be saving."

There is general applause.

"And another thing. As everybody knows, there's not a basketful of worth in any of those video games. What's anybody supposed to learn from them?"

Indeed.

It is a scene being played out around the country in growing numbers of towns, villages and cities and represents an intense controversy whose final outcome could have far-reaching effects. For some, arcade game parlors are the devil's doorway and represent a measurable threat to the welfare of their children. Their solution is to ban arcades from their communities. Others see it differently, carefully separating the game itself from the environment of the arcade, so that thoughtful judgment can be made about two different issues: the value of electronic games and the value of arcades.

The controversy is extraordinarily important, and not only to parents, but to people in personal computing in general, because in allowing video games to be equated with computer games, there is a tendency to write off the whole electronic-game genus as a pastime with no redeeming social value. There is also a tendency, having decided that all of the so-called electronic games are bad, to dismiss the subject without examining it for potential benefits—not only to children, but to adults as well.

## *The games*

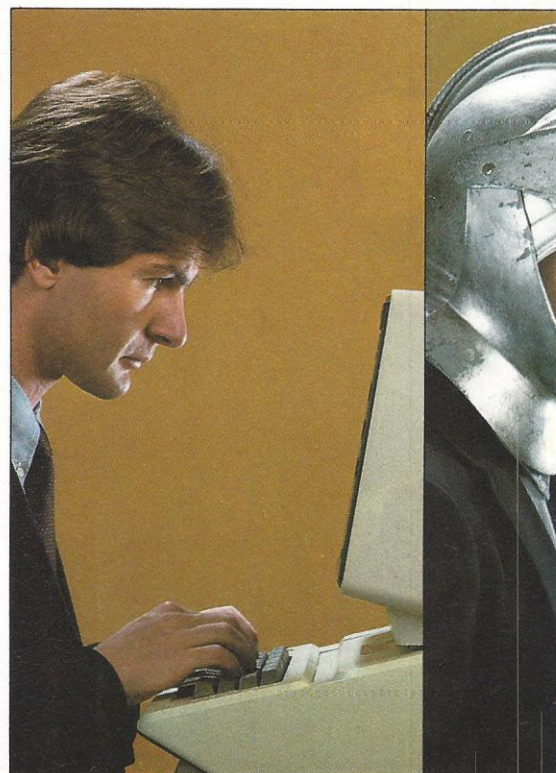
Electronic games—and, at least for the moment, their potential value—are divided into entirely different classes that are distinguishable by the machines on which they are played. Arcade games are what they are and the human value of, say, Frogger as anything more than simple entertainment is dubious.

Games designed to be played on a computer are a different matter. For one thing, they can be designed to be highly interactive and, because of the level of complexity which can be programmed into them—which is to say challenge to the player—they do have value far exceeding anything yet designed for the arcades.

Computer games can be divided into three classes. First come the arcade look-alike games like Pac Man which are most familiar to people in their video-arcade form, or on the

home game machines like the so-called Atari Video Computer, which isn't a computer at all, but a game playing machine. Such games require almost no skill except good hand-eye coordination.

The second class of games, known as simulation games, requires the player to put himself into some kind of role and then play the game within a highly structured environment which, at the very least, forces the



player to view problems from perspectives which are different from his own. Often, these games are situated in a historical setting—such as the Eastern Front in World War II.

The third class is adventure games—and the line separating simulation from adventure is a fine one. Adventure games transport the player to a fantasy world, one without any basis in known reality. It is a world populated by mythical creatures, and the player's imagination is given free rein.

The current controversy over games is generally hinged to the first classification—arcade games—and if those with such questionable learning benefits as Pac Man were all that was at stake, debate would be pointless. But in fact there is a growing body of evidence which strongly suggests some computer games really do you some good. For example, they may help you learn. They may challenge you to seek solutions in the face of situations which seem impossible

to solve. They may encourage you to think through a problem before any action is taken. They may force you to find new ways to see a problem in order to find even a hint of a pathway toward solving it. The net result may well be that you are forced to think differently, more creatively, and smarter. If that in fact proves to be the case—and there is as yet no hard evidence to support that notion—computer games have a good deal more going for them than even their defenders know.

### *Playing to learn*

Playing, as a tool for learning, is not a new teaching tactic. Researchers and teachers have known for years that educational material presented in game format can be a powerful motivation to learn. And, it is clearly a tool which has broad implications for learning by computer. In fact, simulation games are now being designed specifically for educational purposes. Oregon Trail, from Minne-

sota Educational Computing Consortium, is one example. It teaches history students something about the hardships pioneer families endured in their trek from the Mississippi River to the Oregon Territory by placing the student within a simulation of that time and place, and then asking him to take actions based on the problems presented by the program.

"Learning retention is much improved with a simulation game," says Louis Olivas, director of the Center for Executive Development at the University of Arizona at Tempe. The center serves as the continuing education center for the university.

"Learning through game playing is more motivational both for the teacher and for the student. I teach a course called elements of business enterprise, and have used simulations for five or six years," Olivas says. He points out that the quality of the simulation is very important, and adds that a good one allows students to teach themselves.



*Games might challenge you  
to think a complex situation  
through and to seek a solution,  
even when there seems to be none.*

Self teaching through game simulation is, however, one kettle of fish. Carryover of lessons learned into life situations is another, as those who devise military simulations are fond of pointing out after carefully planned tactics based on combat situations fall through the cracks.

Nevertheless, a friend of ours recounts how his son, then a senior in high school, and struggling with trigonometry, actually began to make progress after he found out he could use trigonometry to help him play a simulation about submarines and destroyers.

"He would literally sit there with a pencil and paper and figure out the angle at which to fire the torpedo," our friend reported.

"The trig suddenly began to make more sense to him because he was using it in a 'real' situation".

Still, the question of carryover into life remains. One researcher examining the phenomenon is Larry Wood, a cognitive psychologist at

Brigham Young University. Wood currently teaches a course called Cognitive Processes and Computers.

"I'm interested in problem-solving skills," he says, "and the logic needed for problem solving. When I first played a board game called Mastermind, I saw that it was just logic." Mastermind, at least in its original form, is a board game in which one player inserts colored pegs in a pattern behind a small screen. A challenger tries to guess the pattern of the colored pegs. The challenger registers a guess by placing pegs in the board in the sequence he thinks his opponent has chosen. The player must then state how many of the colors in the pattern are correct. Play continues with new guesses until the challenger has found the correct pattern. The challenger must keep track of both correct and incorrect pegs which help minimize the number of guesses required for a correct solution—and it's a correct solution with minimum guesses.

Wood modified Mastermind to run on an Apple computer by using digits instead of colored pegs. He then conducted an experiment in learning using his modified Mastermind.

To succeed, Wood realized, a player has to keep track of a lot of facts. Using a standardized test, he was able to show that students were better able to retain information in situations unrelated to the game after they had played Mastermind on the computer. He is now conducting further experiments to determine the extent to which skills learned in game playing are carried over to real life situations.

"But playing the game improved the scores of game players over the scores of the control group," he says, "and I assume there's a transfer to real life."

One person who agrees with Wood's assumption is Roe Adams III, the reviews editor of Softalk Magazine and a computer-game aficionado of the first order.



photos by George B. Fry III

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CIRCLE 33

**"Computer-game playing gives my mind the exercise it needs."**

## GAMES

"The skills I learn from playing games certainly carry over into the rest of my life," he says. "I really live games, because the games are my work. I review them all the time. So in my writing I'm always thinking in the way I have to think while I'm playing a game."

But there is a more important carryover for Adams from games to life, one with a connection not nearly so obvious as writing about games for a living.

"Playing adventure games," he says, "is a mind stretcher. It makes you think in different ways. It makes you keep looking for the solution, because you know there is one. I think it's because I always look for a solution that I have become, besides an editor and a reviewer, a highly paid consultant. Typically, clients call me in when things are terrible. Then they give me about 10 percent of the information needed to solve the problem, and they expect a solution right away. After all, that's what they pay the money for. I have to be able to see my way through to the solution—it's like trying to unravel the piece of blue yarn in a whole ball of red yarn and follow it to the other side. That's exactly like starting an adventure game. You know very little when you start... often not even the rules...."

### ***The play's the thing***

Psychologists and sociologists say playing is good for us. Indeed, recent best seller lists have included books dealing with stress relief and its benefits, and the best of those books are heavily endorsed by the medical profession. It's true, of course, that not everyone can lower his blood pressure by chanting a mantra. And for others, the excitement generated by an arcade game would send them along to intensive care. But as the experts have been telling us—with increasing urgency—it's not the way you get the edge off that really matters. It's that you do it at all.

Computer games do just that—they involve the player to a degree which leaves the problems and pressures of super-heated jobs behind. The report due yesterday, the meeting tomorrow, the current family crisis—all disappear for the length of time it takes to play the game. And, if there is not at this writing any consensus about the benefits of playing computer games to relieve tension and relax, there is certainly plenty of evidence that a grass roots movement is under way in that direction. Reports of people playing adventure games into the small hours of the morning, for example, are now common.

Roe Adams is one who believes games are fun as well as challenging. He also sees computer games as a way in which people can accomplish things not possible in their real-life roles. And accomplishment, at least to most of us, is one very important measure of self worth.

"I'm one of the best computer-game players in the country," Adams says proudly. He also claims to be the national champion Wizardry Player, a title that is clearly important, at least to him.

Wizardry is an adventure game from Andrew Greenburg and Robert Woodhead of Sir Tech in Ogdensburg, New York. It's a computerized version of Dungeons and Dragons. Adams says he was the first one to solve the game and defeat the evil wizard Werdna (Andrew spelled backwards), making him the national champion.

On a recent visit with Adams, I asked him to provide a demonstration of Wizardry, which he claims is unique among games for the Apple; no one else has been able to achieve the level of sophistication that Wizardry has. It was also a way to test first hand the hypothesis that playing games can be good for something besides enjoyment and relaxation.

Adams booted the disk on his Apple II Plus personal computer. Our first

stop in the game was the Training Ground where a player can specify the types of characters he wants by making a list of traits—strength, piety, agility, and the like.

"You can play the game a lot," says Adams, now into his role as "Hawkwind," the name he has chosen for himself when he plays Wizardry, and "waste literally hundreds of characters before you find the ones who succeed. I've been playing this game long enough that I have developed some very powerful guys, so let's go to Gilgamesh's Tavern, where my characters are all waiting. We'll assemble our party there." Adams had already typed ROSTER which gave a listing of all the characters available. He chose our party from it and we were on our way.

The patrons inside Gilgamesh's Tavern were a strange looking lot—elves and hobbits, humans, and dwarfs. Men at arms stood sharing a pint with mages and thieves, priests and ninjas—and the look in each eye was cold and suspicious. Hawkwind addressed the group.

"Listen to me," he shouted. "I am about to go into the maze in search of Werdna's treasure. Who will join me?" There was a sudden, ominous silence as each man considered.

"Come on," Hawkwind shouted again, "are you all cowards?"

"You, priest," he addressed a pallid, bill-faced man, "surely you're not afraid of the terror of the dungeon. And you, ninja, you can slay dragons with a single blow. Can you not come and find some adventure? Mage, surely your spells can win the day for me."

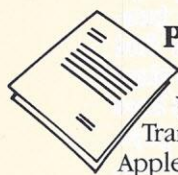
Shamed, a few moved forward and our party was formed.

At least, that's how it played in my imagination. What did happen was that Adams selected "G" from the menu, and with the soft whirr of the disk drive we found ourselves at the Tavern. Adams hit A, for Add A Character from the Tavern menu, and the screen displayed "Who will

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**GAMES**

join?" By typing in the names of characters he had chosen at the training ground, we recruited a party that consisted of A1, a ninja, S, a mage who had powerful spells, and D1, a priest.

"I've played this so long," he said, "and had so many characters, I couldn't keep track of them any more so I just started giving them one-letter names, or a letter and a digit, to remind me of what they can do." It seemed that by playing this game, Adams had learned a simple, effective way to keep track of essential information—in this case, traits of a character useful as a companion for a dangerous quest. Then, accompanied by our party, we selected D from the menu, and proceeded down into the dungeon.

***Werdna's place***

It was dark—a stygian darkness broken only by the pale green light that seeped through cracks between the smooth wall panels of the corridor. Behind us were the stairs we had descended to get here, but we knew there was no backing out. Hawkwind grinned at us. "Come on," he jibed, "do you want to live forever?"

"We're at the bottom of the stairs that lead to the first level of the dungeon," Adams announced. The computer screen, then dark, was divided into five sections. The upper left corner showed a simple graphic representation of the dungeon. It was a three-dimensional drawing so it looked like we were standing at the beginning of a corridor. The walls trailed off into nothingness after two panels which, on Adams' BMC color monitor, were outlined in green. To the right of the drawing was a menu of the actions we could take in the dungeon. We could go forward (F), turn right or left (R or L), or go into camp (C), which would mean we had erected barriers against the monsters in the dungeon. We could also update the status of our party (S) which, on the screen, showed health

and well-being. We could inspect the area (I) to search for dead bodies, as well as set the time delay (T) to give us a breather while we read our messages. We could also move in the dungeon by using the cluster of keys A=W=D—keys which correspond to left, forward, and right.

Just below the menu area and the drawing of the dungeon is the board showing the status of magic spells. The computer displays spells that are in effect in each area, and also describes options available to each member of the party in the event of an encounter with Werdna or his evil monsters. Immediately below is the message area, displaying messages which describe events that happen as the game progresses. Finally, at the bottom of the screen is the status area, where the members of the party—and the state of their health—are listed. Reading the status area, you can decide if the monsters have taken such a toll on your party that you must leave, or whether you still have the strength to go on.

Adams pressed the W key and we moved off into the dungeon. As we went, the picture of the corridor changed. We seemed to move forward one wall panel, and details farther down the corridor came into view. In about four moves we were enveloped. In a flash, monsters were on us! Hawkwind lunges and kills one with his sword, the priest casts a spell and another one dies. Our mage's spell handled another. But Hawkwind is grim. We are taking injuries.

As we went along, Adams drew a map of our route. "The one thing you really don't want to do," he says, "is get lost. If you do, then the chances of ever finding your way out are slim and none. You have to make a map. Since I know this dungeon is 20x20 blocks, I can draw the floor plan of each level as a square four inches by four inches. Then as I go along, I draw where I am, and which way I'm facing. If I get to the point where I'm

not sure, then I go into camp and have a priest cast a DUMAPIC spell which tells me."

Adams was demonstrating exactly what cognitive psychologist Larry Wood had described—learning how to keep tabs on reams of information. Adams has taught himself a simple way to keep track of his location. Without that capability, he wouldn't have a prayer of winning a game, because the screen gives you no clue of where you came from or how to get back.

"This is one reason I'm so good at games," Adams said. "I love to make maps."

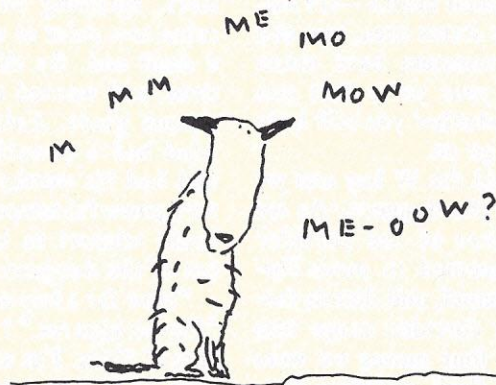
Adams put us into camp, a refuge where the evil citizens of the dungeon couldn't harm us, and had his priest cast a spell to verify where we were. Then we continued on, fighting monsters, mapping our way, until we came to a point at which we ran into a dead end. By this time, we were tired, and wanted to leave this dangerous place. Fortunately, Hawkwind had a powerful Sage with us, and had his worthy character cast a very powerful teleporting spell, which could teleport us back to the stairs out of the dungeon.

"How far away are we?" he asked. "Eleven squares," I replied. "Are you sure?" "Yes, I'm sure," was the answer. "OK," he said, "he goes."

The screen went blank for a second, and then the message appeared, "You have materialized in solid rock outside the dungeon. A1, D1, and S have been lost forever." Then three tombstones appeared on the screen, with the name of each of the three lost adventurers. I had miscalculated our location. We were silent for a moment. Hawkwind had built them up over the better part of several months. They had lived with him and fought for him in the dungeon. Then: "Don't worry," he said. "I didn't take the write-protect tab off the disk. When the program tried to write these guys out, it couldn't so it hung.

*(continued on page 172)*

## Dogged attempt to learn a second language.



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# Doing Business From The Source

David Hughes has integrated The Source into business ventures from teaching to publishing. But beyond all else, the data bank has enabled Hughes to remain in a small town venue, while the reach of his personal computer has grown nationwide

by Lawrence Stevens

If The Source has a prodigy it would have to be David Hughes. Hughes has managed to take the power of the McLean, Va.-based data bank and turn it to his complete advantage. Using The Source, Hughes, a retired colonel, has developed almost as many profit-making ventures as he has interests. He is a publisher, a teacher, a lecturer, and a consultant to town revitalization committees.

The bulk of these activities involves dealing with groups all over the country. But Hughes accomplishes all of this, even though he rarely ventures far from his TRS-80 Microcomputer Model I and his "electronic cottage." For Hughes, living in an out-of-the-way part of Colorado Springs, Colo. is living in God's country; it is something he has chosen not to sacrifice for his professional life. Accessing The Source gave him the choice. Because of the wide reach a personal computer and a data bank give, he is able to be a successful entrepreneur without leaving the "clean air and sunshine of the Rockies."

"I'm very lucky," he says. "For

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*Lawrence Stevens is based in Springfield, Mass., and writes frequently on computer topics.*

most people to be able to do what I do, they would probably have to live near a metropolitan area and have a large staff, a lot of overhead, and plenty of money to fund their ventures."

Hughes has become a telecommuter, someone who works from his home using a personal computer to communicate with either corporate headquarters or clients. And Hughes has taken this concept a step further. He has also integrated the far-flung reaches of data banks like The Source into nearly every aspect of his telecommuting life.

The Source is just one of hundreds of on-line data banks that personal-computer users can access by dialing up an information-packed central computer, using a modem and communications software. What the user will find in the vault of a data bank varies, depending on the individual he dialed. But everything from games, to stock reports, to esoteric law and medical journals, to notices posted on electronic bulletin boards is available.

The telecommuting venture closest to Hughes's heart is an electronic magazine called *Source Trek* that he has published on The Source since 1981. Source subscribers can call

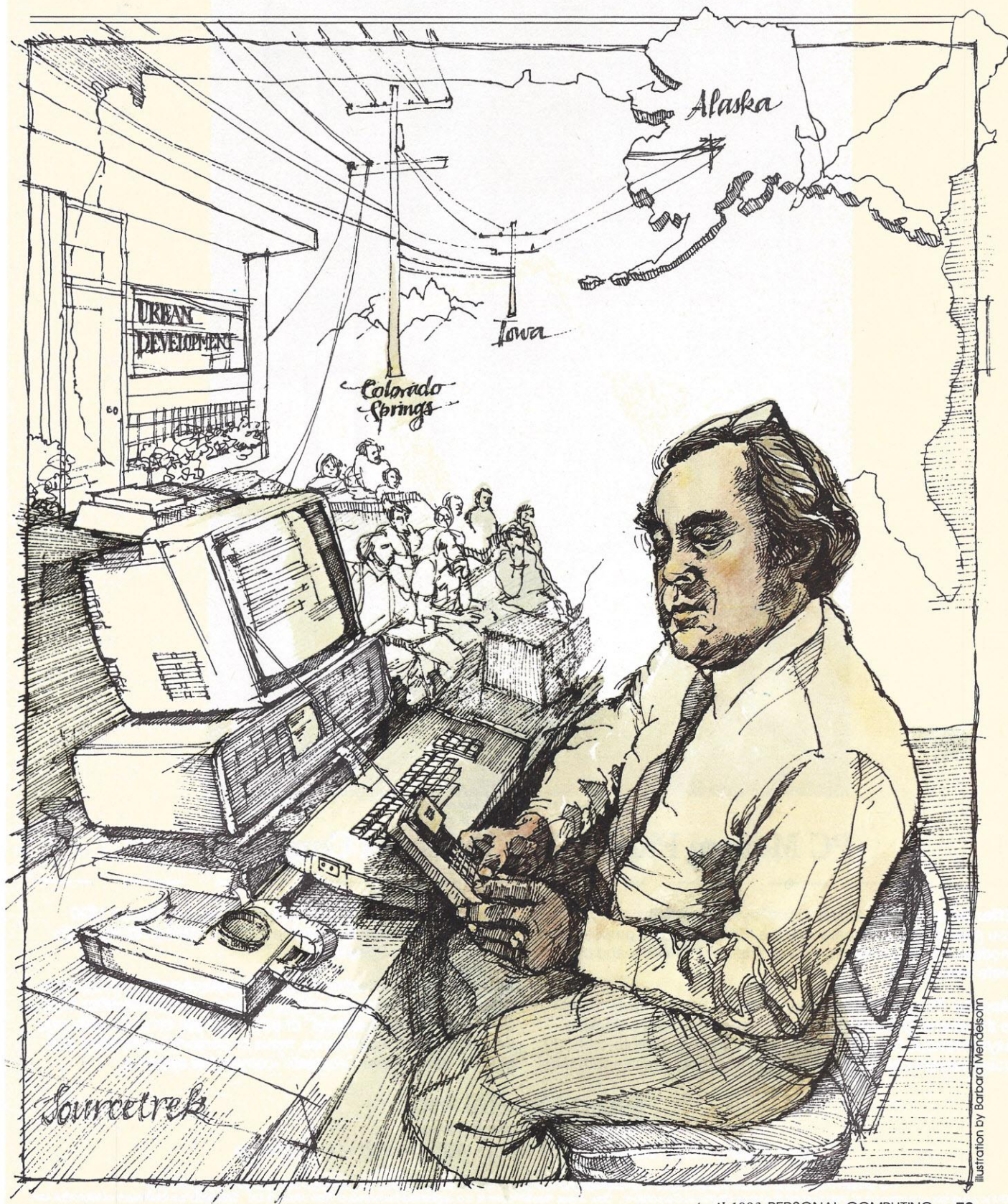
*Source Trek* onto their screens by asking for the Mail and Communications part of the data bank's menu when they get on-line. Hughes's readership is measured by the amount of time these subscribers leave their computers tuned to *Source Trek*. The Source then pays Hughes 17 percent of the connect-time fees it receives.

## *Will Rogers and Rod McKuen*

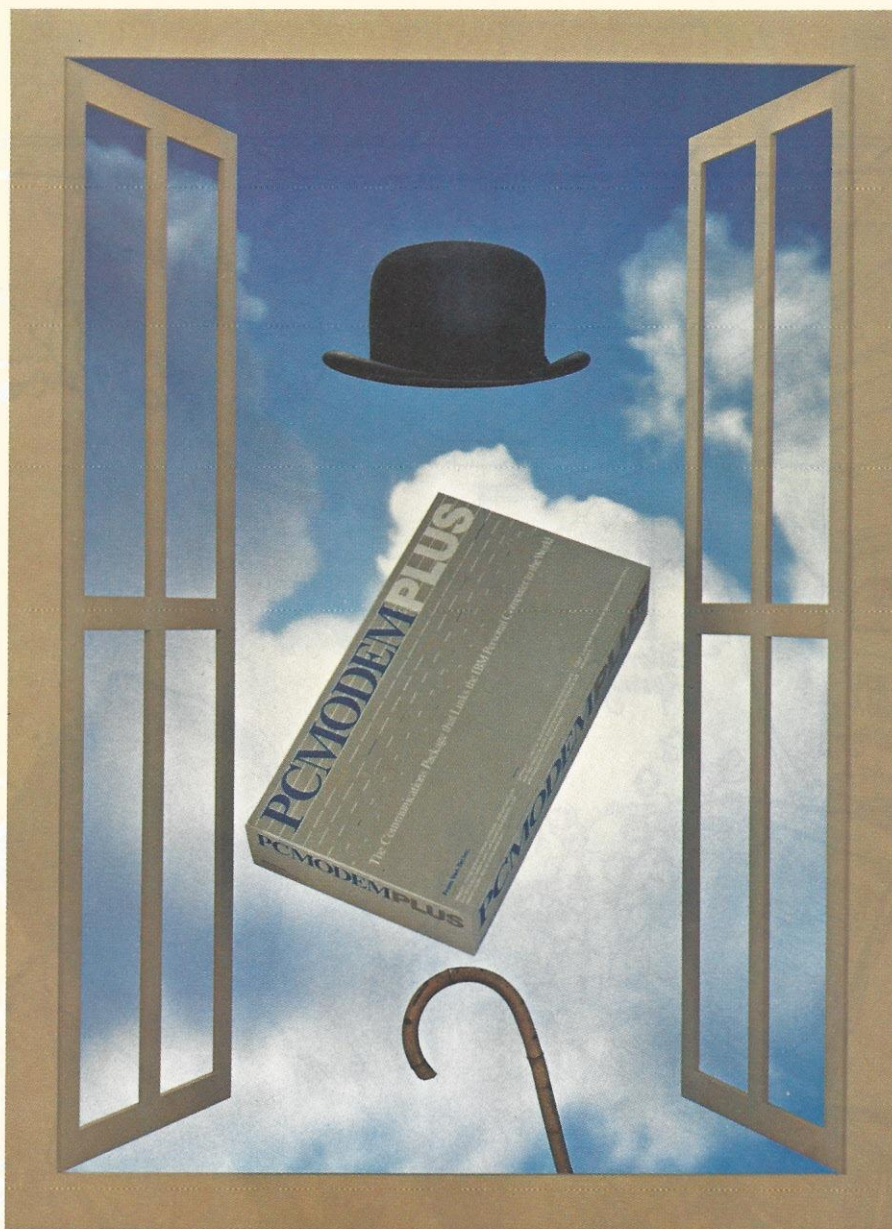
*Source Trek* is one-part modern-day Will Rogers, one-part high-tech Rod McKuen, and two-parts pearls of philosophy about the age of personal computing. The magazine, most of which Hughes writes himself, ambles through a range of poetry, treatises, technical computing pieces, tales of the benefits of small-town life, and even ghost stories.

One recent series, for example, discussed how Source users could better convey nuances of meaning as they communicate with each other via computer, hampered as they are by the inability to use facial expressions or voice inflections. A typical edition of *Source Trek*, which has no set publishing timetable, usually carries about 10 articles.

*Source Trek* is Hughes's first real attempt to capitalize solely on the



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***"When you live in a somewhat isolated area, information is at a premium and discussion clubs and forums are rare."***

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**BUSINESS**

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power of his personal computer. And although he is not raking in riches from it yet, he's earning approximately \$400 each month for his efforts. The Source's subscription base is currently close to 24,000, but as the home personal-computer market takes off during the next few years, a boom in data-bank subscriptions is expected to occur. With that type of computer market growth, Hughes says that \$400 in monthly royalties is the bottom of a very steep profit curve for him.

### ***Print vs. electronic***

When he started *Source Trek*, Hughes had some preconceived ideas about publishing gathered over many years of talking to editors and publishers of print journalism. He found many of these concepts unusable in electronic journalism. For instance, while a print magazine can, and sometimes must cater to wide audience tastes—the "something-for-everyone" approach—*Source Trek*, because its only means of revenue comes from its ability to keep readers' attention, has to hold the interest of many people with each piece.

"I thought at first that I could get away with a few good articles and a few fair ones," Hughes says, "with the good ones carrying the issue. It didn't work. My readers would read only the good ones and sign off on the less interesting ones. That might not hurt a print magazine's profits, because its partially interested customer has at least paid for the whole magazine. But with *Source Trek*, a bad article cuts into my profits and wastes space. I truly have to hold reader attention to keep the meter ticking."

Because of this, when he posts an issue of *Source Trek*, Hughes monitors reader connect time carefully, using an automatic tracking system provided by The Source. When readership reaches a plateau and then drops—or if it barely leaves the ground—for a specific article,

Hughes will usually replace the piece with another.

This instant feedback allows Hughes to fine-tune his publication continually, something print publishers cannot do easily or accurately. "Normally when you put out a magazine, despite all the reader surveys, you have to guess what the readers want," he says. "The power of the electronic age allows me to take the pulse of my readership daily. That's what makes *Source Trek* work, I believe, for my readers. They can read it one day and then check it every other day that week to see if it has changed or if additional material of interest to them has been added."

The options offered by telecommuting provide a wide range of publicity schemes Hughes can choose from to publicize *Source Trek*. Recently, he hit upon an idea that was kindled by the popularity of a segment of The Source bulletin boards. Data-bank bulletin boards are free, open files where subscribers can post short notes to each other. Recently, a scad of personal ads advertising for mates have made The Source bulletin board an increasingly popular meeting place. Seeing profit in the lovelorn, Hughes wrote a romance novella for *Source Trek* in which two people meet on The Source and fall in love to live, one assumes, in intertwined and networked bliss forever. He advertised the story on the bulletin board. The result was 100 new *Source Trek* readers.

What makes his magazine such a viable publishing opportunity is that almost all of the expenses that besiege print publications—paper, postage, printing, advertising, promotional and editorial costs—are eliminated in his venture. Hughes's only overhead is the price of The Source connect time incurred as he enters the story into the data bank.

At first he barely paid attention to these charges, but a few large Source bills early on now make him careful to keep these charges to a minimum.

A change in method has proved economical. Initially, he wrote *Source Trek* material directly onto The Source by connecting his computer to the data bank and keying in the copy as he composed it. But he realized he was being charged for slow typing and for the time he spent thinking. He gets around this expense by writing *Source Trek* on his TRS-80 Model I, using the Scripsit word-processing program, before wiring into The Source. Then he up-loads the completed manuscripts in one batch on The Source. This cuts his *Source Trek*-related connect time by about three-fourths. A complete magazine now costs him approximately \$20 in on-line time.

### ***The novice telecommuter***

The idea of launching his magazine evolved gradually as his interest in telecommuting burgeoned. Hughes bought his first personal computer in 1980 when he was a full-time town planner and revitalizer. He had just started a business called Enjoy Colorado, a company that sold information about opportunities and conditions in the Rockies to firms or individuals who were thinking of relocating to the area. He planned to use his TRS-80 mainly as a repository for the data he was to provide to clients, and also for limited word processing. This initial computer purchase introduced him directly to The Source, because the data bank was a lifeline of information support that connected Hughes, coming from a small town that had limited computer knowledge, to metropolitan areas where computer literacy was more prevalent.

"At first I used The Source exclusively to get information about my computer that was not available to me locally," Hughes explains. "For example, I had just bought my TRS-80, but the salesman in my area knew less about the machine than I did. So I joined the TRS-80 user's  
(continued on page 79)

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**BUSINESS**

**DOING BUSINESS**

*(continued from page 75)*

club on The Source, in which we talked over problems and questions we had in common. Whenever I posed a question I knew I would get an answer within 24 hours.

"I became addicted to chatting with people by computer, and [I] would chat with anyone who was connected to The Source and wanted to discuss anything. When you live in a somewhat isolated area, information is at a premium and discussion clubs and forums are rare. The Source gave me the chance to reach out to other personal-computer owners."

But chatting—this is where one Source subscriber types in a statement and another subscriber keys in a response—soon frustrated Hughes because it was not a forum that allowed a lot of personal-computer owners to participate at the same time. It was still just a two-way conversation, and not much different from a telephone call.

"Then I got the idea of inviting people to meet me at a Source bulletin board," Hughes says. "They would put up a notice; I would respond with another notice; then a third or fourth person would join in with his notice. We were creating ad hoc discussion groups."

But the bulletin-board idea, though it began to catch on, was also limited; only short statements could be posted. So Hughes lobbied the powers that be at The Source to open up a full-fledged file where long messages could be left. It was a way, he felt, to begin formal discussion groups on computer telecommunications. But the only way something like that could work was if The Source provided an open access file. While each Source subscriber is given a file number for others to drop information into, it's locked and can't be read by other users. Nevertheless, Source officials resisted Hughes's plan.

Then one Source subscriber, a Hughes correspondent, developed a subprogram that could be attached to data communications software. It allowed individuals to lower the security of their own Source files so other users could read them. It was exactly what Hughes had been waiting for. Immediately, with its security dropped, his file was turned into a meeting place.

At first, Hughes randomly posted articles on his file. Finally, when he had enough material, he decided to turn the file into a magazine—and that was the genesis of *Source Trek*. It was also the beginning of his effort to have The Source pay him royalties. It took a little pushing, but as Source officials saw the amount of increased connect time Hughes was bringing to the data bank, they relented and offered him a royalty fee of 9 percent, which later grew to 17 percent.

Source Trek is just the tip of the entrepreneurial iceberg that telecommuting offers David Hughes. He has gradually worked the personal computer into all of his business ventures.


Primarily because of his success in being the top consultant helping to revitalize Colorado Springs—he has personally brought in 87 new businesses and created 450 jobs—Hughes's aid to regional redevelopment organizations is in great demand in his area of the country. The first thing he tells these groups is to get personal computers and use the power of information exchange to their benefit.

***The Palace Bar Saloon***

This type of recommendation has led to some relatively unorthodox presentations before redevelopment groups. Take the one he gave late last year at the Palace Bar Saloon in Leadville, Colo., an old steel town that was drying up with the economy. Hughes started his full-day seminar at the watering hole by plugging his Osborne 1 portable computer into the

television set above the bar—"At least for one day they weren't watching the Denver Broncos on that set," he says—and connecting the computer to The Source via the saloon telephone. When The Source was on-line he pointed to the television monitor and said, "This tool is your first line in revitalizing your town." He then walked the session participants through the rudiments of telecommuting, explaining to them how they could use electronic mail to communicate spreadsheets, business-plan templates, and proposals to one another and their consultants; use data banks to receive on-the-spot information on commodities and real estate market prices; share information with other groups around the country involved in the same type of work.

With similar zeal, Hughes teaches an English course on The Source with credit given by the local Colorado Technical College. His students live all over the world and have included the ex-Lieutenant Governor of Alaska Red Boucher, a feed and grain merchant in Iowa, and a housewife in Florida. Students have all the advantages of a personal mentor with the convenience and low cost of a correspondence course. The \$100 tuition is paid to the college, which in turn pays Hughes a salary. Generally, Hughes leaves a typed lecture in the course file that students respond to, or ask questions about. This is not the run-of-the-mill English course, though. Since it's an electronic class, the types of issues brought up include the differences between the printed word and the computer screen word.

Hughes is, by all accounts, a pioneer in the use of data banks as tools to propel a wide range of ventures. Though he has not yet made megabucks from his Source ventures, he has been able to live among his favorite hills and still be in contact with the people around the world who are willing to pay "fair market value" for his expertise. This is a choice combination for him. 

---

# Made To Measure Software

If ready-made software doesn't suit your business, consider custom programming—it may be the perfect fit

by David Collopy

**S**o you think your problem's unique. You've looked at what seem like thousands of packaged programs. The inventory control programs are close, but not close enough. The sales analysis programs give you 80 percent of the information you'd like to have, but they lack the all-important 20 percent that you *need* to have. You wonder whether anyone else in the world operates an order entry system the way you operate yours. The packaged programs just don't get the computer to do what you want it to do.

Try as you will, you've not been able to find an inventory control program that fits your business. What are you going to do? Let that new personal computer sit in the corner and gather dust?

"No," you assure yourself, "there are plenty of valuable applications out there." You know you'll need word processing and there are hundreds of packages from which to choose. No problem there. You already own one of the spreadsheet programs and you're noticing larger profits because you can analyze all the "what-if" situations a business like yours could ever hope for. But what about the bread and butter? What are you going to do about that?

J. H. Riesenbergs and Associates, a

small Cincinnati food brokerage firm, faced this problem a few years ago. Jerry Riesenbergs, president, recalls: "It was a matter of either hiring more people and continuing to process tons of paperwork, or condensing that paperwork with a modern, more efficient method of handling data." His data requirements were specific. He needed an order entry system that would allow him to view data in a variety of ways. This data is constantly used to track orders. It is often used for sales analysis. It is sometimes used to understand, follow, and negotiate contracts. And it is also used for "bookings," which means tracing the activities of two or more files, comparing each of them, and adding updates where needed.

More specifically, data has to be traced by supplier, customer, product, and by volume of product to analyze sales trends on a constant basis. This information is also used to show the status of relations between customer and supplier.

Riesenbergs and Associates employs eight people, including two part-time clerical workers. Titles seem to mean little in this modest office, where the telephone is usually answered by the person closest to it. Riesenbergs points out: "We are responsible for gaining, processing, and shipping ingredients and commodities." He places emphasis on the word "We."

"We're a service company," Riesenbergs

says, "and we have to be able to communicate constantly with our customers and suppliers. As the communications channel to both, we must have the most up-to-date information. Quite simply, the better our communication system, the better we're going to service our customers. We don't physically do the shipping, but we make sure our customers receive their products when they ask for them."

## *The key to success*

J. H. Riesenbergs and Associates currently represents 12 companies (or suppliers). Each of those companies operates in a unique fashion, insofar as their own data requirements are concerned. What is good for the goose is not necessarily good for the gander. Subsequently, Riesenbergs knew he would have to have programs that would be flexible enough to accommodate each, and, at the same time, service over 250 customers with some degree of consistency.

Improving the method of handling orders was not an area where Riesenbergs was willing to compromise. After all, this company (formerly Lampe Brothers) had a good track record which dated back to 1927. Timely information had always been the key to their success.

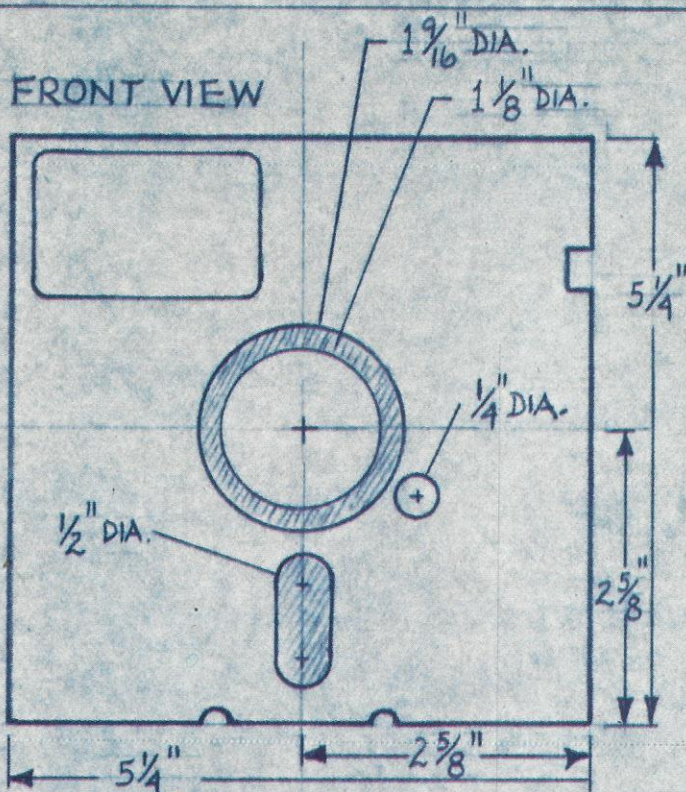
The generic packages offered by software vendors couldn't meet the challenge. Even the best of the packages would require that he rebuild his

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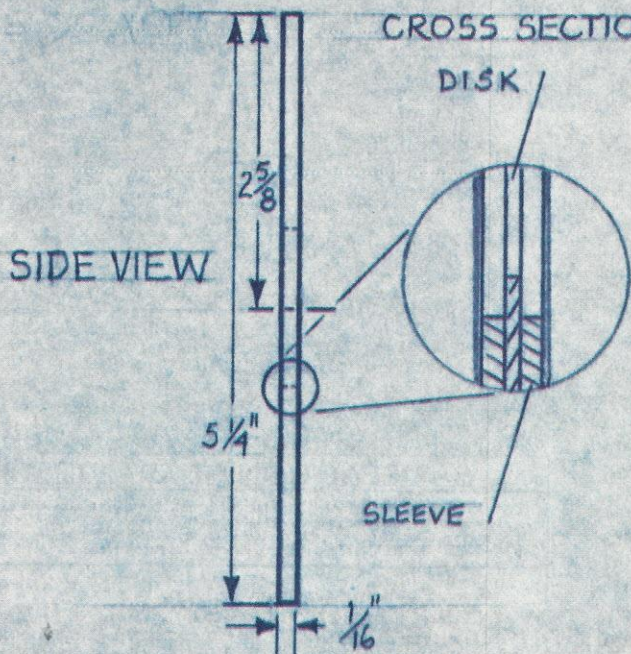
*David Collopy is a free-lance writer, specializing in computers, from Cincinnati, Ohio.*

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***"It's imperative that the programmer and businessman agree on what the essentials of the program will be."***

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**BUSINESS**

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order entry system from the ground up. Instead, Riesenbergs decided to commission customized programs for his operation. Riesenbergs was lucky. He didn't have far to look in his search for a computer consultant who could develop the programs he needed. He just happened to have a brother-in-law who had been in the data-processing business for 20 years.

Bill Meyer knew very little about his brother-in-law's business. Meyer had served his apprenticeship in data processing working on mainframe systems. Much of his time had been spent as an applications programmer and systems analyst, before he was bitten by the personal-computer bug. A few years ago he dove into the newly emerging personal-computer field in earnest, and is now president of Micro Masters, a service and consulting company dealing in personal computers.

Meyer and Riesenbergs, along with Bob Weigand, a computer programmer who had joined the project at Meyer's request, sat down and made a detailed blueprint of the system.

The first order of business was for the programmer to learn about the client's business. Meyer and Weigand took a crash course—something like "Everything You Always Wanted to Know About the Food Brokerage Business..."

Having so little knowledge of the other's business requires that a strong relationship of trust be established between the consultant and businessman before the project is too far along.

### ***The value of trust***

Riesenbergs is quick to note the value of that trust. "Generally, the small businessman doesn't have the background or knowledge to do alone what we were able to do as a team. Small businessmen are usually experts in one area—whatever that area may be. It's best to concentrate on your area of expertise. I'm running a business," he says "and my job

is to sell sugar, corn syrup, cocoa, etc. I already have enough administrative duties that tie me up and take me away from potential sales. I imagine this is true of most anyone in a small-business situation. They need somebody who can guide them, and they've got to trust the computer expert to take them in the right direction."

Beyond trust and the early information exchange, the development of customized software should include a number of checkpoints to be sure the program will give optimum performance. "We learned that we would have to reorganize our way of thinking about how an order was handled," Riesenbergs says, "but we were involved in every step of the order entry program's development." Meyer and Weigand would design a section of the program and present it to Riesenbergs with the following questions attached: "What do you think is wrong with this? What do you think is right with it?" This gave everyone an opportunity to amend the original design before it was put into the program. Several meetings were scheduled along the way, to be sure the program would reflect the information required for any given operation of the program's menu.

Meyer says, "It's imperative that the programmer and businessman agree (up front) what the essentials of the program will be. You start with, 'How do you do it now?' If a consultant doesn't ask that question, find another consultant." An equally important question is, "What don't you have in your present system that you'd like to have in your computerized system?" A good programmer will look for ways to give you not only speed and better organization, but also enhancements that were previously unthinkable.

The entire package for Riesenbergs and Associates was tailored to fit the operation as it had been running. A lot of time was spent going over each facet of the business and trans-

lating each detail into computer code.

The customized programming has given Riesenbergs and Associates an orderly system that handles the order entry process from the initial order to the time the invoice arrives, verifying that the order has been shipped. Before the computer was installed, the same information was spread throughout the office, over as many as five desks, and each step was processed manually.

Everybody in the office has access to, and regularly uses, the TRS-80 Microcomputer. The TRS-80, coupled with the customized programs, has replaced tons of paperwork.

Riesenbergs admits the company still encounters an occasional error—"the human element," he calls it—but the system itself is so fail-safe that the computer regularly rejects information that isn't consistent with the standards they've defined. "That has added a level of control," he says, "that we didn't have before."

Mary Kob, who has been with the company four years, says, "At first I thought the idea of getting a computer to handle the order entry system was terrible. We had everything under control and here we were going to change the whole thing. But, the computer opened up my job. It's given me more responsibility because I can do more. The (customized) programming allows us to do everything exactly the way we want to do it. It lists everything we require, in the order that we need it. We're better organized and we access information faster. As opposed as I originally was to the new system, I realize I'd really miss it if we didn't have it now."

### ***Choosing a consultant***

Not everyone considering custom software for a personal computer is fortunate enough to have a computer consultant in the family. As the personal computer becomes more commonplace in business, there will be a corresponding increase in the number of computer consultants. Be that as it



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CIRCLE 35

***“Custom programming can be like trying to fit a brick in a place that wasn't quite cut to size. Be sure you have the right person for the job.”***

may, how do you find the right one for you right now?

The first place to shop is at your local retail computer store. Most of them have a list of consultants, and a quick discussion with the store manager about your needs should be helpful. Be sure to ask for the names of at least two or three consultants. You'll want to interview more than one.

Many consultants get their work through referrals. When they've done a good job for someone, word gets around. Check with the local computer user's groups. You'll probably find more candidates than you've time to interview.

The universities and colleges are often helpful to the businessman in search of a consultant. Be sure to specify your needs and be forewarned that a first-year student programmer—though often cheaper—probably won't write programs as efficiently as will a full-time consultant. In this, it's a clear case of getting what you pay for. Read about operations that are similar to your business. You may find a programmer who's already written a custom system like the one you've been looking for.

“Custom programming can be like trying to fit a brick in a place that wasn't quite cut to size,” says Bob Weigand. “You'd better be sure you have the right person for the job.” Finding the right person for the job is not always an easy task, though. Weigand suggests you choose a programmer/consultant in the same way you hire an accountant or an attorney. Sit down with the programmer in an interview environment and get to know one another. This not only gives you a chance to make a decision, it gives the programmer an opportunity to understand your expectations of him. Custom programming is a two-way street.

“Don't hesitate to get a second opinion,” he adds. “It's like when the American Medical Association suggests you get a second doctor's opin-

ion before you decide to have surgery. This is basically the same thing. The reason we need two opinions is because very few of us really understand medicine. When we hear a doctor throwing around medical terminology followed by ‘and it will cost you 50 bucks,’ we don't know if what he said is worth 50 bucks or even if his medical opinion is right.”

There are a number of other qualities you should look for in the ideal programmer/consultant. Your business is your livelihood. The same should be true for the candidate you select to do the job. That is not to say that a part-time or free-lance programmer will not deliver a quality product. In most cases he will. Inevitably, the programmer who will deliver the best quality product (whether he does programming part-time or full-time) is the one who presents himself in a businesslike manner. He'll appear confident of his ability to do the job and he'll be candid about anything beyond his limitations.

Make no mistake about it, there are quite a few ambitious, conscientious, and thoroughly professional programmers out there working as consultants. And yet, a danger encountered by too many businessmen is selecting a consultant who is still a little wet behind the ears.

A professional will normally be glad to furnish you with the names of clients for whom he's worked. This may be your most valuable source of information. It seems when people are happy with their custom software, they're very, very happy. Conversely, custom software has been known to make people very, very angry.

A professional should be happy to discuss any part of the customizing project with you. It's difficult for the software designer to give you any real idea of the completion date of the project before he's fully aware of your data requirements. However, once you feel satisfied that the

project is well defined by both parties, and you've come to terms on the value of the consultant's services, get it in writing.

### ***Don't be impatient***

More than two months of development took place before Riesenbergs got his first look at the customized order entry system. “We were all anticipating that day,” he says. “We were going to plug it in, and right then and there we were going to solve all our problems.” Well, that's not quite the way it works.

Creating custom software is like building a high-performance internal combustion engine. You must first put together all the parts, and be absolutely sure you've met the specifications. You fire it up and pay attention to how it responds to a variety of conditions, such as air-fuel mixture, level of acceleration, etc. You may find that it is not yet giving you optimum performance, so you pull the spark plugs and make sure the gap is precisely set. You adjust the carburetor. In other words, you tinker a little bit until you've got it running just so.

Once the custom software is fine-tuned and you're ready to roll, you're also going to have to deal with learning to use it. Again, the automobile serves as an example. Though all of Riesenbergs's people were confident drivers, none had ever driven a high-performance racing car. Once they gained confidence in the computer, and their ability to use it, they had no qualms about getting out there on the track with Mario Andretti and A. J. Foyt.

Though happy with the end result, Riesenbergs would make a few changes were he to do it all over again. “We didn't anticipate the future as well as we might have.” The computer is presently equipped with two 5¼-inch floppy disk drives, and Riesenbergs can see ahead to the time in the not too distant future when  
*(continued on page 164)*

# How to save on ZX81



**THE ORGANIZER** An information storage program. Store the names, addresses, phone numbers, birthday and anniversary dates of your friends and business acquaintances.



**THE STOCK OPTION ANALYZER** Evaluate stock options quickly. Output includes an unexercised ROI, annual ROI, and NET worth. Last trading day calculated by computer.



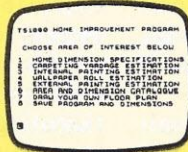
**VU-CALC** This program constructs, generates, and calculates large tables for financial analysis, budget sheets, and projections. An immensely powerful analysis chart.



**CHESS AND CHESS CLOCK** Six levels. All the legal moves including castling and enpassant. Keeps a separate record of plays made for easy reference. Play another opponent or match wits with the computer.



**THE BUDGETER** Keep track of your personal budgets and expenditures in categories such as food, clothing, rent/mortgage, medicine, education, savings, auto, and more.



**THE HOME IMPROVEMENT PLANNER** Store up to 20 room measurements (length, width, height), compute total area in each (wall, floor), estimate costs of painting, wall papering and carpets and draw house blueprints.



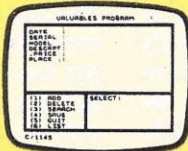
**SUPER MATH** Drill yourself on addition, subtraction, multiplication, and division with five levels of difficulty. Each problem graphically depicted.



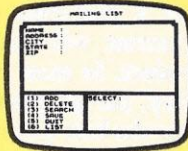
**BACKGAMMON AND DICE** A perfect blend of chance and skill. Uses machine code to choose its moves. Full game including graphics board, rolling dice, and double cube. Play the computer or another opponent.



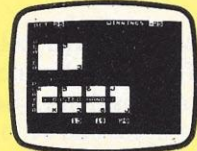
**THE LOAN/MORTGAGE AMORTIZER** Compare the cost of loans from different banks, review the details of your home mortgage. Be aware of the cost and how to minimize that cost.



**THE HOME ASSET MANAGER** A home inventory program that can be very valuable in case of fire or theft. Records date of purchase, place of purchase, description, price, serial # and model #.



**THE LIST MANAGER** Mailing List—keeps track of personal or business mailing lists of up to 115 names by name, address or zip code. Phone Book—keeps track of personal or business numbers for up to 180 names.



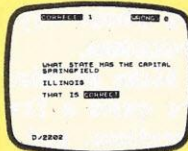
**THE GAMBLER** Match your Blackjack skills with the ZX81 or TS1000. Full graphical display of cards dealt and winnings. Includes Double Down, Min-Max betting. Also a Slot Machine complete with rolling tumblers, payoff values, and coin drop.



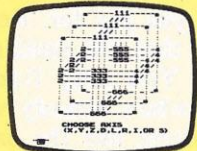
**THE COUPON MANAGER** Keep track of coupons you save showing what they are for, where they are offered, starting and ending dates for validity.



**REAL ESTATE INVESTMENT ANALYSIS** Two different investment strategies. The first selection allows the user to choose between renting or buying. The second selection consists of a detailed analysis of the rental investment property.



**STATES AND CAPITOLS** Test yourself on the fifty states and their capitals. Three options of review are available. (1) States, you provide capitals. (2) Capitals, provide states. (3) A mix of states and capitals.



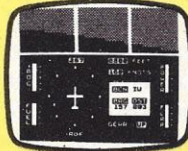
**THE CUBE GAME** The cube can be displayed in three views: (1) Solid; (2) Two-Dimensional (unfolded); and (3) See-thru cube (3-D). You start with the cube solved, set it up any way you like, or pick up from a previous session.



**THE CAR POOLER** Keep track of car usage by driver, destination, and date. Rider data and time of departure is logged.



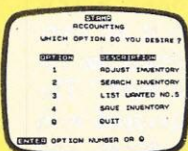
**PERSONAL FINANCE PLANNER** Perform financial calculations, finance a house, a car, keep savings accounts, repay loans and calculate an amortization schedule which can be generated for any of the financial programs.



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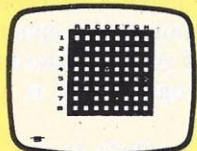
**THE STAMP COLLECTOR** Inventory and store up to 600 SCOTT numbers in a single session showing quantity on hand, by major classification, and provide full want list support.



**PORTFOLIO ANALYSIS** Program performs minimum risk and market sensitivity calculations for a portfolio composed from a set of stocks. A portfolio is formed which gives the minimum amount of non-market risk for a given level of sensitivity.

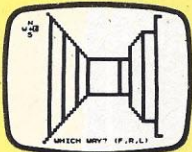


**STOCK MARKET—TECH. ANALYSIS** Program uses "technical analysis" of price and volume data to forecast the direction of the Market or of any stock. Track up to 6 stocks without reloading. You need 30 trading days of data, closing price and day's volume. Analytical summary of each stock average is computed.



**THE MIXED GAME BAG** Bowling—roll your ball down the alley controlling its flight from a keyboard. Robot War—you are pitted against evil ROBON ROBOT in a duel of wits. Bingo Caller—use ZX81 or TS1000 to randomly call a Bingo game.

# or TS1000 software.



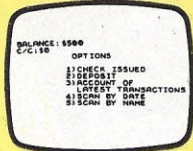
**SUPERMAZE** Navigate your way through a three-dimensional maze, with trapdoors, gold bars, marker stones, and compass. Ten separate mazes. Three-dimensional graphics.



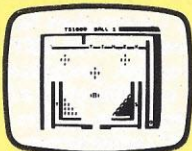
**THE PUZZLER** Comes with two options: Inversion and Double Inversion. Inversion takes at least 250 moves to solve it. Double Inversion is twice as hard.



**BIGFLAP ATTACK** You're being attacked by giant birds! To defend yourself shoot the birds right between the eyes. 10 levels of play ability.



**CHECKBOOK MANAGER** A personal or business checking account program to store and sort banking transactions. On 90-minute tape, up to 3,600 transactions can be stored.



**PINBALL** Plays like real pinball complete with flippers, bumpers, "nudge" bonus points and more. Uses fast, efficient machine code to choose its moves.



**INVENTORY CONTROL STOCK I** —keeps track of inventory levels, suppliers, re-order levels and types for up to 400 items. **STOCK II** —keeps track of inventory levels for up to 2,500 items.



**STOCK MARKET GAME** Bull or bear? This realistic simulation lets you analyze information, buy and sell stocks, take out and pay off loans... and win, if you can accumulate \$50,000 in "The Market."



**SPACE RAIDERS, BOMBER** Times/Sinclair version of the popular arcade games full of bombs and rockets and collisions with skyscrapers.



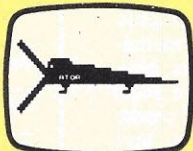
**FORTRESS OF ZORLAC** A super fast game in which you are the commander of a fleet of spaceships. Your mission is to rid the galaxy of the dreaded alien, ZORLAC.



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# The Modern Management Team

Teaming the talents of a secretary with the efficiency of a personal computer can enhance productivity—even when you're on the road

by Richard D.R. Hoffmann

**M**arshall Graham bought a personal computer for himself and his secretary, but not because he had a tough problem to solve. He did it because through personal computing he foresaw a valuable opportunity: the chance to get his office-design firm Environetics in on the ground floor of the booming office-automation market.

Graham's initiative paid off. His experience in working with the new technology—particularly during his frequent travels—succeeded in making Environetics one of the hottest consulting firms in the business. But his secretary Yvette Chaveco saw opportunity for herself as well: By mastering personal computing she not only streamlined repetitive secretarial tasks, but also expanded her responsibilities and role in the home office. Today Graham and Chaveco form a smoothly running manager/assistant team that is far more creative and productive than it would be without the third element—personal computing.

Graham is senior vice president of Environetics, a firm that plans and designs offices and workspaces according to the principles of efficient human engineering. His experience with personal computing began two years ago when he was tapped to

head Environetics's management technology division, a consulting service to help businesses adapt office automation technology to their operations. "Since we expected the personal computer to become an important part of the office environment," Graham says, "I figured it was an



**Marshall Graham, executive VP of Environetics, an office-planning/design firm.**

area that we should know a lot about—personally—especially if we were going to advise others on what to do with the computers."

At the time his hands-on experience with personal computing was nil. He did know, however, that many times when he was on the road in his frequent travels, he wished he could have had his secretary's aid with letters and documents, even though he also needed her to manage the office in his absence from the home base. Would a personal computer make it possible for him—and his clients—to have the best of both worlds?

When the management technology division was formed, Graham searched intensively for a personal computer, finally deciding on a Commodore CBM 8032 system. "We chose Commodore for several reasons. First of all, it had a much better keyboard than the other computers I looked at, and the keyboard includes a numeric keypad. I'm convinced that anyone using a computer in business needs that separate keypad, especially a non-typist like me who would have to 'hunt-and-peck' for the numbers on a regular keyboard. Commodore also had a one-megabyte floppy disk drive—the CBM 8050. The other models didn't have anything like it at the time. I liked that big drive. Without such a drive, I would have to play with the disks all the time, loading and unloading. That's too time consuming. Finally, there was good word-processing software available for the Commodore—specifically Wordcraft 80 and Word-Pro 4. They were easy to learn and

photos by Werner Wolff/Black Star

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*Richard D. R. Hoffman is a freelance writer who covers the computer and electronics industries.*

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## PROFESSIONAL/ MANAGERIAL

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had more functions than other programs." Among those functions were built-in telecommunications protocols, which immediately appealed to Graham in light of the time he spends on the road.

Graham promptly took the system home and, with the manuals, taught himself the basics. After a short time, he brought the unit into the office and installed it at his secretary's desk. Another CBM 8032 system was purchased at that time for Environetics president Lawrence Lerner in Los Angeles, and two NEC 5530 letter-quality Spinwriter printers were added—one in Graham's New York office and one in the Los Angeles office.

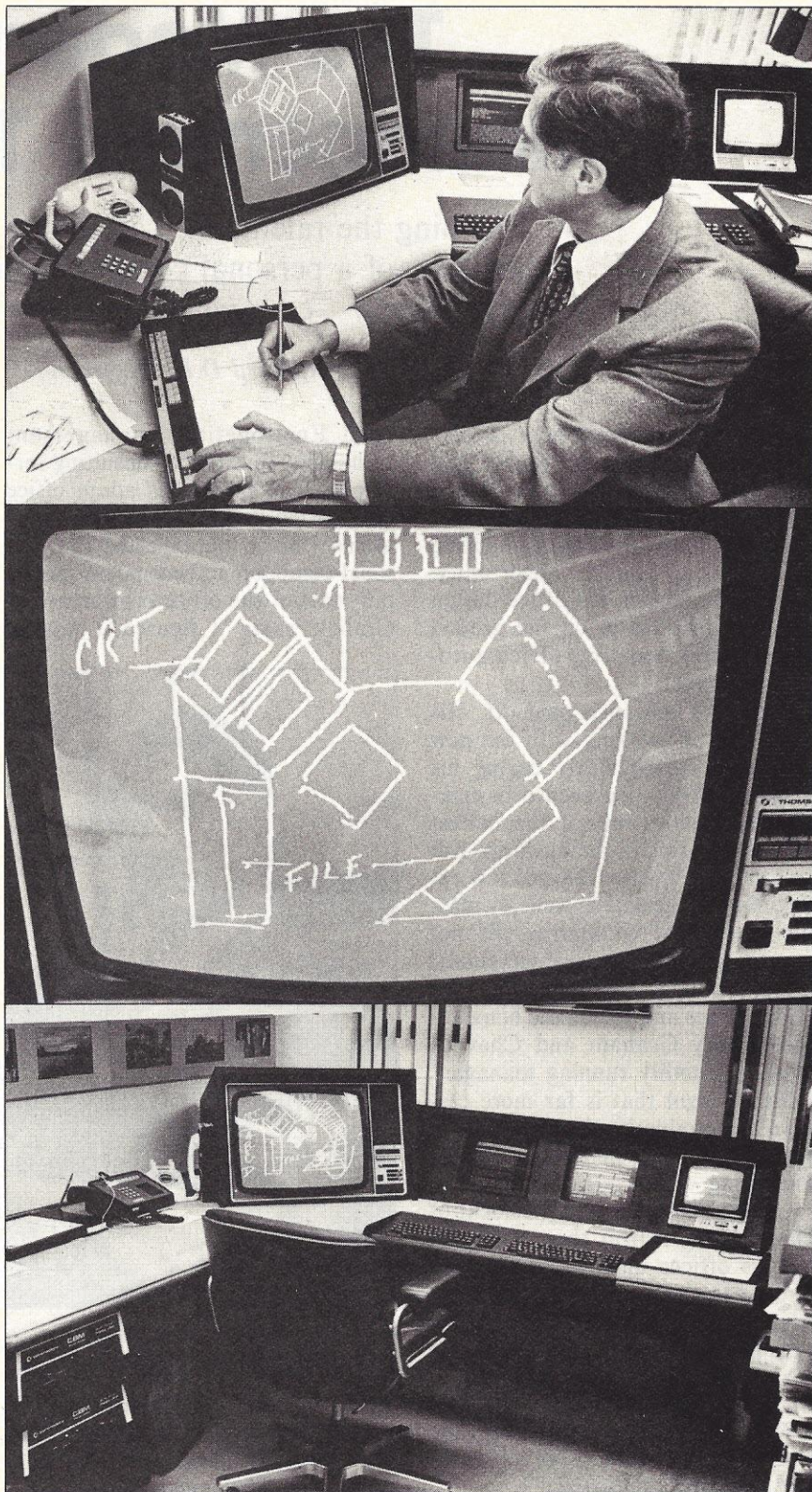
"Yvette Chaveco was hired shortly after I brought the computer into the office," recalls Graham. "She liked it immediately. I showed her a few basic routines on the machine with the word-processing package and gave her the manuals. Then step-by-step she learned how to use the machine."

Chaveco was overjoyed at the opportunity. "The computer introduced me to the world of high-tech I'd heard so much about, and I was thrilled. Fortunately for me, when I was hired, Mr. Graham was about to go on a two-week vacation. So I had that time to sit down and figure out the machine."

"I also left specific instructions about what I expected her to know when I got back from vacation," says Graham, "including the CPU and peripheral functions, as well as the word-processing software."

Chaveco says his clearly defined expectations were helpful in focusing

**Graham uses his electronic blackboard for design and graphic teleconferencing. The blackboard is at the apex of his custom-designed workstation, which includes two built-in Commodore CBM 8032s and a VIC-20 with a color monitor. He works out sketches of office plans, calculates the cost of office equipment, and implements the specifics of his designs.**



*"Personal computing has changed the role of the secretary and given me the freedom to do more with my time."*

her attention. "He didn't know the word-processing software that well himself," she says, "but by the time he got back from his vacation, I was able to show him what he needed to know to operate word-processing software to its best potential."

Despite this early success, Chaveco discovered that both the hardware and software manuals were only effective learning aids "if you do everything right. If you inadvertently make a mistake, they don't tell you how to get out of it. At that point they're no help at all. I found them to be very poorly written." As a result, she had to develop a strong support system by telephone with the service representatives of the computer vendors.

But the experience of working out those frustrating difficulties opened up an unexpected opportunity for Chaveco—teaching others. "Today,"

says Graham, "Yvette controls our computer resources. She is the one who trains people new to the computer, both in hardware functions and word-processing software. She's already trained all five of the people in the New York office who currently use the computer. Without her, we'd have to give new people the manuals, and say, 'Go and learn it,' and then I'd spend most of my time answering questions. But she can get someone started on word processing in a half-hour by first showing the person how to do it, and then giving him the manual and letting him learn. She's always there to coach people over rough areas. They won't know all the ins and outs of the machine in a short time, but they'll be able to produce."

"You definitely need a person to walk you through the functions," Chaveco adds.

To help alleviate the problem

presented by poorly written manuals, Chaveco began writing her own procedure manuals for specific hardware and word-processing functions relevant to the Environetics system. Her manuals include chapters such as "Environetics Shared Commodore System," a three-page, step-by-step set of directions describing how to link two CBM 8032s to a single NEC Spinwriter. The guidelines include instructions on loading the word-processing package Wordcraft Ultra, and contain the communications protocols necessary to link up to eight of the personal computers to peripheral devices such as printers or the CBM 8050 disk drives.

Chaveco has also created instruction manuals for loading the CBM 9090, a 7.5-megabyte hard disk drive as well, for making backup floppy disks on the CBM 8050. "I test out each set of instructions she writes," says Graham. "If I see a difficulty, I'll advise her and she'll work on it. She does the detail work. This way, she teaches me how to use the peripherals or software that I'm not familiar with."

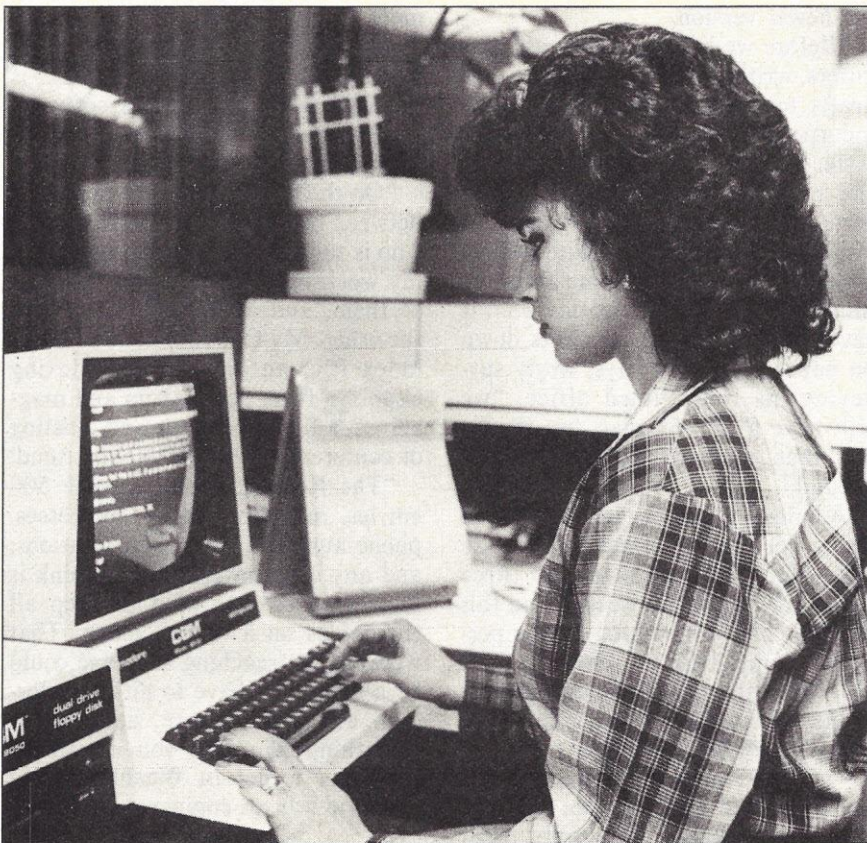
### *Productive synergism*

In effect, Graham and Chaveco have learned how an executive and a secretary can increase each other's levels of productivity. Examples come easily to their minds.

"I may compose a report in our Los Angeles office on one of my trips, or I may write a proposal for a client on one of the computers in my office," Graham says. "In that case I merely put the disk in my out box, and Yvette will pick it up, print it for me on one of our Spinwriter printers, and also make a backup copy of the disk. Then, she puts the disk in my in box, along with the printout."

"If I write the document longhand or dictate it onto a tape, Yvette will

**Yvette Chaveco, a self-taught computerist and Graham's secretary, now teaches computing to her office mates.**



*"It keeps things neater, and I don't have to bother Yvette. This has changed the way we operate."*

## **MORE THAN A SECRETARY**

**A** secretary with a personal computer becomes more than a secretary.

Yvette Chaveco, secretary to Marshall Graham, sees the personal computer as a tool that vastly increases her effectiveness, makes her more responsive to her employer, and affords her more time to do more tasks. In addition, her new skills have given her a greater sense of worth and self-esteem.

Her workstation includes a Commodore CBM 8032 personal computer; a NEC 5530 Spinwriter 132-column, letter-quality thimble (print mechanism) printer; a CBM 9090 7.5-megabyte hard disk drive for main storage, a CBM 8050 one-megabyte dual floppy disk drive; and a telephone modem.

Besides troubleshooting, training, writing manuals, and managing the office's computer supplies, Chaveco also performs the indispensable tasks of an executive secretary. Most of these are now automated. She has learned several word-processing software packages as well as Oz (a data-base system), and gained a "working knowledge" of VisiCalc.

The executive secretary cum administrative assistant points out, however, that the personal computer isn't a work saver. "There's always plenty to do," she says. "But the computer is a time saver. I can get more work done each day."

There are less tangible, but no less important considerations. "There's less 'Yvette, make this call,' or 'Yvette, file this.' I'm not always having to interrupt one task to take care of three others. The personal computer has changed the regular boss-secretary relationship for me.

"The computer has helped bring about this change by doing away with a lot of the repetitive tasks I used to have to do," she continues. "Now if he needs something, he can usually get it on his own.

first transcribe it, and put the disk and the printout in my in box. When I'm ready to work on it again, I can load the disk into my own drive, open the file, look at the directory, access what I want, and edit it on the screen. Or, if I'm out of time, I can take the printout on a plane with me, or edit it at home. Yvette will either make corrections onto the disk from my edited hard-copy version, or she will print out the final document from my edited disk."

Another time-saver and paper-cutter is the way the computers allow Graham and Chaveco to take advantage of the old journalistic technique called "boilerplating." It works like this: If a proposal or letter being prepared includes information already contained in a previous document, the word-processing package allows Graham and Chaveco to lift whole sections of that earlier copy (dubbed "boilerplate") and insert them into the newer version.

"Before we had the personal computers, writing proposals took several drafts to cut and paste older copy, incorporate revisions, and edit for style. I'd mark up several versions of the proposal, and someone would have to retype each draft. Doing revisions this way frees up quite a bit of time. I estimate it saves me about 30 minutes a day, not to mention what it saves Yvette. And it also cuts down on paper. Sure," he says, wryly surveying his report-lined office, "we still have a lot of paper, but it's lot less than we used to have floating around."

A half-hour per day may not sound like a lot, but it comes out to 125 man-hours per year—about three extra full-time work weeks. And this isn't the only time saved by the personal computing of Graham and Chaveco. Another tandem time-saver is the electronic-mail function on the Wordcraft Ultra software.

"If Mr. Graham is in Los Angeles and I have to get messages to him," Chaveco explains, "I simply enter

them into the word processor, and send them through my modem to the Los Angeles office. Out there, Mr. Graham can log on and 'open his mail.' Similarly, if he needs to get an important proposal to a client, and the company's regular courier run can't deliver it on time, the information on the disks can be sent over the phone lines. Such instant delivery can be crucial, and it's much less expensive than going through The Source."

## ***There's still more***

Like any executive, Graham needs to use the computer for other applications besides word processing. Two of the functions he often uses are Ozz, a data-base manager, and VisiCalc, the popular spreadsheet program. "I use VisiCalc," he says, "as a calculator for job costing. I calculate things like staffing levels on jobs, or the cost of buying additional equipment for our offices. On some problems I can save as much as two days with VisiCalc," he claims. But Ozz is the real workhorse in his software stable, running second only to word processing as a time saver.

"On the mornings I'm in the office between business trips, the first thing I do is turn on both my computers in my workstation. I load Ozz into one of them, and Wordcraft Ultra into the other. My Ozz files include a Rolodex file, an article file indexing clippings from newspapers and magazines, a file of vendors, and a listing of conferences I might like to attend.

"The Rolodex contains some 500 entries, including names, addresses, phone numbers, business affiliations, and any other information I think is important. Yvette used to keep all these files on a real Rolodex. That worked, but reaching someone could be a chore. I'd have to hit the intercom and call Yvette, asking her something like, 'Do you remember that guy I met in Washington? I think he was an engineer. What was  
(continued on page 166)

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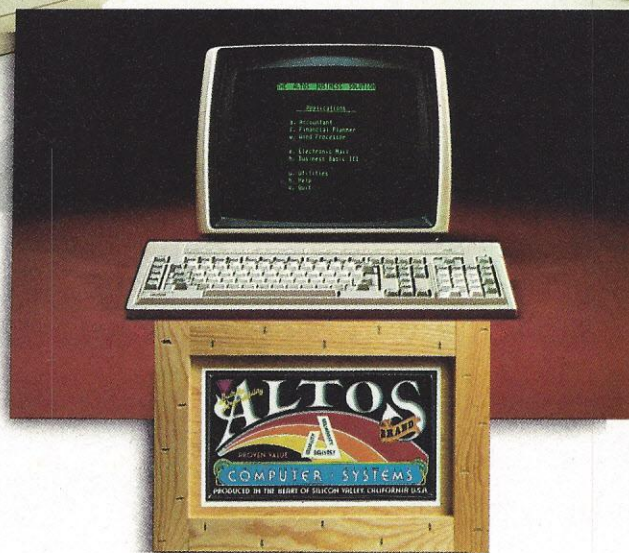
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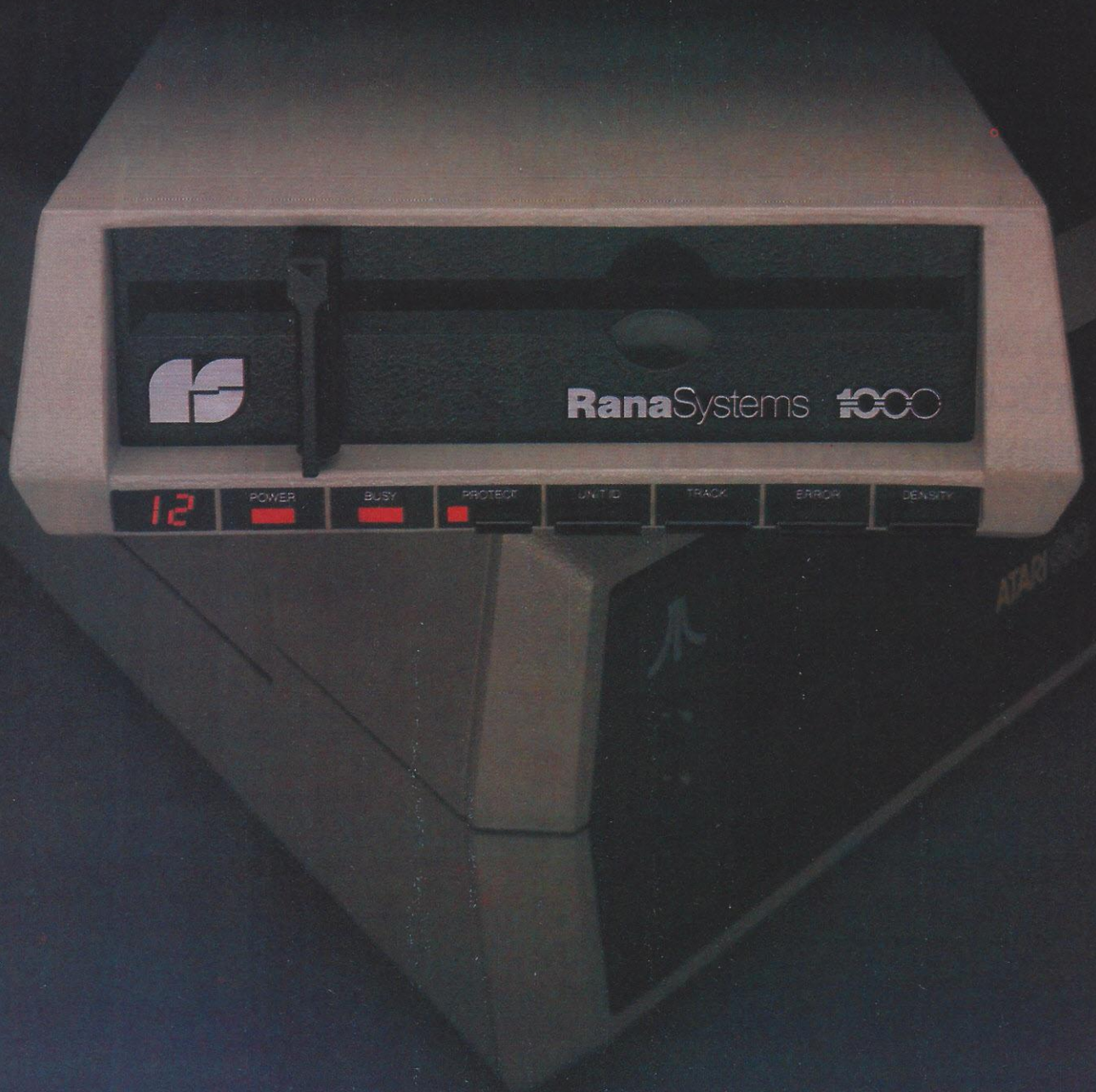
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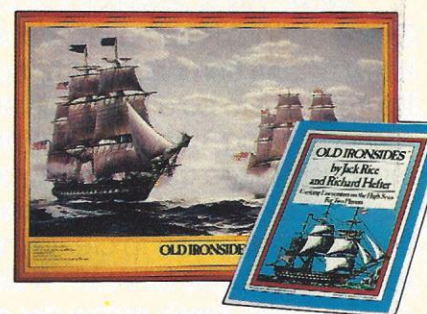
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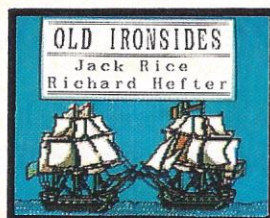
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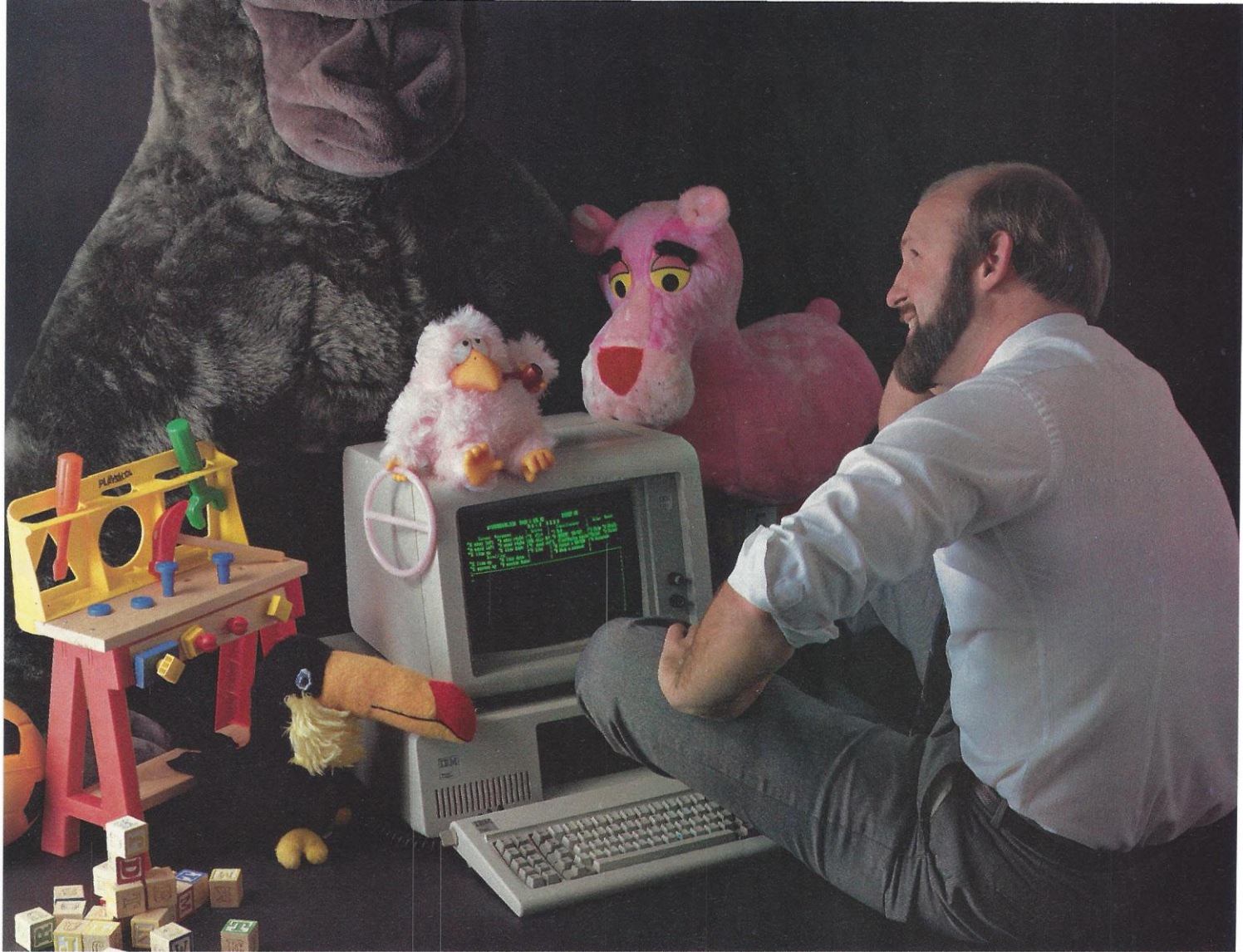


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CIRCLE 37



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# A Congregational Computation

When a New Jersey church needed a new financial-management system, personal computing provided the answer to its prayers

by Jeffrey Rothfeder, Associate Editor

*"Lord, guide us as we face the difficult decisions and enter the world of new technology. Lead us to the right answer as we attempt to find the correct computer that will enable us to continue to do your good works. Amen."*



he Grace United Methodist Church in suburban Wyckoff, N.J. had a mission. It had suddenly found itself with \$3000, a bequest made specifically for the purchase of a personal computer, and the church pastor was sending his parishioners off on their computerization pilgrimage with a prayer.

The five men and one woman who made up the computer task force bowed their heads. In the Spartan surroundings of the church recreation hall, this group of computer-literate congregation members had come to pool their technical knowledge to ensure a successful computer purchase.

Faced with a tight budget, the church had to rely on its only abundant resource—the human talents of the task force—to make sure the correct computer decision was made at the stipulated price. There could be no consultants, gold-plating, or cost overruns.

The meditation lasted about 10 seconds—perhaps never has com-

puterization been accompanied by such solemnity. When the prayer was over, the members of the group raised their heads, laid out their papers, and prepared to debate in earnest the merits of three different computers.

Wyckoff is an affluent town, a typical upscale bedroom community. Many of its residents work in service or professional occupations—accounting, chemistry, high-technology—that put them in daily contact with computers—although mostly with the mainframe variety. The task force members who met at the church were no strangers to the sequence of steps any organization must follow as it decides on its computer purchase.

It starts with identifying the reasons for purchasing the machine—simply, what you want the machine to do. A search for the software that can perform these tasks follows; and finally the hardware is chosen to fit the software.



ublicly, the road to computerization at Grace Methodist began on a warm July Sunday morning when the church pastor, Reverend Robert J. Duncan, announced from the pulpit that the church had been given a bequest of approximately \$3000 for the purchase of a personal computer. Duncan said a computer task force meet-

ing would be held in two weeks, and invited any interested congregation members to attend.

"Officially, that's the way it all began, but actually I dropped the seed a few months earlier. I was as surprised as anyone else when Rev. Duncan made his announcement that Sunday to find out that my seed had taken root." Speaking is Reverend Ernest Vander Kruik, Grace Methodist's burly 26-year-old assistant pastor, who looks more like a linebacker than a man of the cloth. For a long time Vander Kruik had understood the benefits a computer can bring to an organization. As a young instructor in the late 1970s at the Portsmouth Abbey School, a Rhode Island Benedictine academy, Vander Kruik was one of the first teachers in the country to bring computers into the classroom. Using a computer outfitted with a template that aped chemical reactions, he had his students "carry out" experiments they would never have been able to do in the school laboratory environment.

While this was a significant accomplishment, the value of the computer really hit home to him when, upon coming to the church in July of 1981 as the assistant pastor, he found himself saddled with what he terms "machine work."

"I was doing work like going through long, handwritten family member lists, looking for the names of people who had specific talents and

## HINTS FOR SOFTWARE PILGRIMS

**R**everend Vander Kruik's investigation of canned church software turned out to be unnecessary, but had he pursued it, he would have found a variety of programs written specifically for religious purposes. Here's a list of the more popular examples:

- **Manna**—a record-keeping system for churches that keeps track of monthly, quarterly, and yearly pledges; maintains directories, mailing lists, and reports on Sunday school enrollment. From Bourne and Co., Inc. (Charlotte, N.C.).
- **PARSEC**—developed under the guidance of Catholic priest Father Joe McLaughlin, PARSEC is a data-base manager that monitors collections and contributions. From American Business Products (Englewood, N.J.).
- **Automated Church Transaction System**—a church membership system that lists congregation demographics by occupation, income, race, language or other user-defined fields. This type of system enables church elders to plan programs based on an accurate picture of the makeup of the congregation. From Century Computer (Dallas, Texas).
- **The Bible Study Series**—chapters from the Bible written on diskettes with a search feature that allows the user to find specific passages. From ASGA Software (Memphis, Tenn.).
- **Books of the Bible and Bible Test**—multiple choice examinations that can be used as study aids for learning Bible facts. From Color Software Services (Greenville, Texas).
- **Bible Quiz**—enter the Bible verse you want to memorize and the program produces the passage followed by multiple choice test questions to gauge how well you learned it. From Professional Computer Systems (Bloomington, Ill.).

could get involved in a certain project or would be interested in joining a committee," Vander Kruik says. "After spending hours going through these lists and finally finding the people I was looking for, I'd have to go to another file to get their addresses. Then I would run a mailing to these people, using the addressograph machine. I knew that with a computer I could do this job a lot better and a lot quicker. And this would give me more time for more important church work—people work. We also definitely needed a computer for keeping track of pledges and contributions."

On a visit to the Van Howling family in April 1982, Vander Kruik mentioned how much he would welcome the addition of a personal computer at Grace Methodist. It was his intention to preach the gospel of computerization as quietly as he could, but as often as he could. Three months later, when Russ Van Howling, a computer engineer, died, his widow Jane made the \$3000 bequest to the church.



**T**he first computerization task force meeting on August 9 drew 16 members of the congregation. This group included Fred Bergen, the church's part-time volunteer financial secretary who dealt with the accounting chores. He was there to plead the cause of using the computer to keep the books at Grace Methodist.

The meeting was a freewheeling discussion that started with an in-depth look at the workings of the church's front office, something many members of the congregation knew little about. Perhaps the meeting's greatest value was that it allowed members of the congregation to get an inside view of the office work involved in processing their contributions and in running their organization. The meeting also gave Grace Methodist the opportunity to

reassess its entire accounting process, one that had become overtaxed and cumbersome. In that sense, one of the church members recalls, the meeting was purifying for the church. "The idea that we were going to computerize enabled us to start all over and clean out the kinks in our book-keeping," he says.



**T**here are 900 church members at Grace Methodist, and they pledge about \$150,000 annually. This accounts for almost the entire operating budget for the church. Families make their pledges each November, and the money comes in over the course of the following year.

"Some people make their contributions monthly, some weekly, some once a year, some are late, some are early," Vander Kruik says. "Each contributor is given a set of numbered envelopes. Each Sunday four tellers list the amount of the contribution next to the envelope number in a wide ledger book. Then, in order to keep a record of how close to the yearly pledges the congregation's families were coming, the tellers or Fred Bergen had to start subtracting the amount of the pledge from what had been given already and compare the result to what the November pledge had been."

It wasn't necessary to nail the details to the church door for everybody at the meeting to agree that this was a tedious process. Even more tedious are the quarterly statements that go out to contributors. These statements keep the congregation up to date on their pledges. It took nearly five days every three months to manually transcribe this information from the ledger book onto preprinted quarterly forms and send the statements out. What's more, because all calculations were done by hand, accuracy was never ensured.

Fred Bergen's urgings did not go

*The church had to rely on  
its only abundant resource—its  
human talents—to make sure the  
correct computer decision was made.*

unheeded. It was agreed that the church needed a bookkeeping system that would stream-line the process. Accounting became the first priority for computerization.



urther discussion led to plans for a "pledge record and reporting system" that would allow Bergen to input the envelope number—which would call up the corresponding family record—and then input the amount of money received. From there, the computer would do the calculations and monitor how close to budget the contributors were. Quarterly statements could be printed out at the touch of a button.

At this point the possibility of using a spreadsheet instead of accounting software for this record and reporting system was raised. "An accounting package is not needed for what we are doing," said Morris Johnson, a congregation member who is a chemist at American Cyanamid. "It's too expensive and not really necessary. We're probably talking \$1000 for an accounting package and \$150 for a spreadsheet."

"Whatever step we take," Walter Kraft, a computer auditor and acting chairman added quickly, "let's make sure we're covered for the future as the church grows. We have to get a system that can handle the data as our congregation and community continue to grow. But let's shelve the question of exactly what to purchase—either hardware or software—for the moment. Right now, we are dealing with needs identification."

Rev. Vander Kruik seized this opportunity and made his pitch for taking what he called his machine work and turning it over to the machine. He asked for agreement that the computer serve as a family record system, listing complete details about all families in the congregation, in-

cluding their talents and interests. This would enable Vander Kruik to simply call up information on congregation members either by their family names or by keying in their interests or talents. There was unanimous approval of Vander Kruik's computerized family record concept.

Others in the group mentioned word processing for newsletter and form-letter preparation as a possible need, but that was rejected because the purchase of a letter-quality printer alone would use up half of the allotted money.



o a consensus was reached. The church's computer priorities—its software needs—were set. Those who knew enough about computers defined them with phrases like: "What we are looking for then is actually a mixture of an accounting package with data base management attached." Others in the group may not have understood the terminology, but they still seemed to feel a certain amount of justifiable pride. Having entered the meeting as computer novices, they had now taken the first steps toward computer literacy. As one member put it: "At least I've got one foot in the computer age."

Rev. Duncan set a tight deadline for the arrival of the machine at Grace Methodist. Though an admitted computerphobe—and in little hurry to use the machine himself—Duncan was painfully aware of the realities of church administration. One of the first rules is that earmarked money should be spent quickly, lest it be used for other purposes and disappear. Duncan was also well acquainted with the limited attention span of task forces. He felt it was important to get the volunteers up and running, because group energy dissipates if a conclusion isn't in sight. With these thoughts in mind, and with pledges for the 1983 pro-

gram due to roll in, in November, Duncan asked that computer hardware and software recommendations be made on September 15. With that timetable, he hoped, the church trustees could approve the purchase by September 20.

When the meeting broke up, the more computer knowledgeable of the congregation—a group of five of the original 16—took over the job of choosing the hardware and software. The full group, it was felt, was necessary to plan direction for the church. But a much smaller, more computer-sophisticated group—members of the church who had used personal computers—was needed for making a purchase decision.

The prime movers of this subcommittee were Kraft, the computer auditor; Rev. Vander Kruik; Bob Rodgers, a computer consultant, and his son Rick, a programmer; Tebor Vari, a computer science graduate; and Gregory Warwick, a northeast regional representative for Apple Computer Inc. These task force members chose for consideration three computers with which they had experience and which they knew were within the church's budget. These computers were the IBM Personal Computer, the Apple II, and the TRS-80 Model III Microcomputer.



embers of the group isolated the questions that needed to be answered as each computer was considered: How much data can the machine carry, and will it meet the church's current and future requirements? How reliable is the computer? Can the whole system be bought from one source so service and instruction are easily available? What software supports the computer?

To answer these questions about the three machines, Vander Kruik divided his task force talent into three groups, each to consider the virtues of

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## *The young clergyman's intention was to preach the gospel of computerization as quietly as he could, but as often as he could.*

a different computer. Warwick was put in charge of the Apple; Rick and Bob Rodgers had the TRS-80; and Vari had the IBM. Vander Kruik was to look into the available off-the-shelf "spiritual" software that the church could consider. (See Hints for Software Pilgrims, page 100.)

The group of six gathered again toward the end of August, armed with the results of their investigations. There was an unmistakable feeling in the air that the members had taken their mission seriously, and each entered the meeting with the intention of making a winning case for his machine.

Gregory Warwick brought in an Apple II. As an employee of Apple, he tempered his presentation somewhat. But clearly, he tried to describe how the Apple II, more than the other two computers, fit the church's needs in a simple way. He stressed that the Apple II, for its price range, was reliable and still in many ways state-of-the-art technology; that it was easy to learn and use; that there is more software for the machine than for any other computer on the market; and that service is readily available through a wide distribution chain. He didn't ignore its failings, though he downplayed them. He said the Apple lacked upper- and lower-case letters, but that they were only necessary for word processing; it lacked an 80-column screen, again a word-processing consideration; and it did not come equipped with a numerical keypad. Warwick recommended—if the Apple was purchased—using VisiCalc for accounting and budget work, and a simple data-base manager like PFS to keep the family records.

Tebor Vari didn't have an IBM to demonstrate, but he praised the machine by saying that it would be *the* personal computer over the next decade and that most of the new software will be written for it. He pointed out that the IBM has, at 256k, a memory capability four times that of

the Apple II; and he felt that the IBM logo meant dependability and service. Price was a question mark, he conceded. It would be hard to purchase an IBM system for under \$3000. But like a car salesman selling a Cadillac in Miami Beach in 1963, Vari appeared to feel that he only needed to use a soft-sell approach.



And then came the turning point in Grace Methodist's pilgrimage to computerization. Rick and Bob Rodgers set up an artist's easel and displayed a detailed report listing the virtues of the TRS-80 Model III in comparison with those of the other two computers. The price for a complete system was considerably less; it was, said the Rodgers, more reliable, and there was a good service network behind it. They then calculated the amount of information the church would need to keep in its bookkeeping and family member system presently, projected this into the future, and said that keeping this much data on the Apple would require three disk drives, while the TRS-80 would demand only two. Peripherals for the IBM, they pointed out, were far costlier than those for the TRS-80. In all, there was the unmistakable elan of the carnival barker in their sales pitch.

There was also some confusion in the room. Why the hard sell on the TRS-80? Why go to all the trouble of making such a splashy presentation? Rick Rodgers had the answers to these questions. The next page of the report detailed a step-by-step plan proposing that he develop the software for the church at no cost to the congregation. Because he owned one, the program would have to be written for the TRS-80. Rodgers was offering free software to Grace Methodist if the church was willing to act as the product's beta test site—the guinea pig. After its implementation in Wyckoff, the package would remain

the property of Rodgers, under his copyright, to be marketed in the future.

The unveiling of Rodgers's idea was unexpected, and it made further discussion almost moot.

"Everybody else got beaten out by Rodgers because he gave an aggressive presentation," Vander Kruik recalls. "He offered us a deal. Nobody else did."

The decision-making really ended there. Halfhearted attempts to convince IBM to sell the church a computer at a discount in exchange for the computer giant's use of Grace Methodist's case history in future publicity campaigns failed for lack of interest on the part of IBM. Other ideas, like a parallel setup where VisiCalc would be paired against Rodgers's system in an efficiency race, also died before they left the drawing board.



But there was more to the decision to go with Rodgers's plan than just the power of the hard sell and economic viability. The church's penultimate responsibility is to the people it serves. Computerization was the cause that brought this task force together last fall, but it was really the people of the task force who kept Grace Methodist rallied around the purchase of a computer. Rick Rodgers's plan meshed perfectly with the activities of these people and the way they had approached purchasing a personal computer. As a group, they were pooling their talents toward a common cause. And Rodgers's idea reflected this group effort. His idea was a perfect example of a congregation member putting forward his best abilities for the betterment of the congregation. Grace Methodist couldn't turn its back on that.

"Running a church is different than running a business," Vander Kruik says. "As a pastor I have to be



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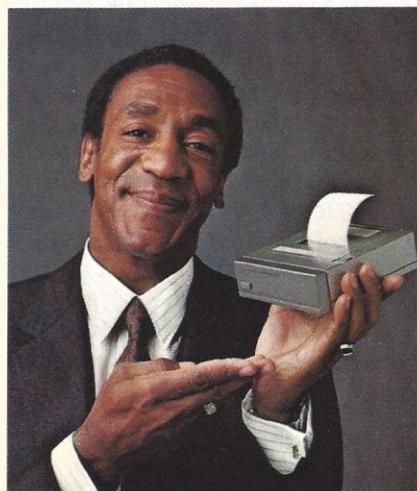
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*People scolded Gutenberg for printing the sacred word on that sinful machine. Some people also feel that computers have no place in God's scheme of things.*

sensitive to the needs of everybody in the group. If I were running a business I would only have to be sensitive to my bottom line and I might have looked at Hodggers's plan more closely, compared it to other canned packages, and so on. As it was, Hodggers's plan was well thought out, and it was a good example of human ingenuity. And we couldn't ignore the fact that it was human ingenuity that brought us to the point of computerization."

The TRS-80 Model III arrived on September 25, complete with both disk drives wired up, and a line printer; the deal was finalized at \$2964. After approximately 120 hours of programming work, Hodggers set up his software package, called MIS Plus, in mid-October.

In many ways, MIS Plus is an elegant software package and it perfectly fits the needs of Grace Methodist. Written in BASIC, it is a cross between a data-base manager and an accounting package. Though it was developed specifically with the needs of the Wyckoff church in mind, Hodggers feels that his package, though not modifiable, could easily solve similar accounting and record-keeping problems at any church.

The center of the program is a Family Master List, which is located—with the instructions that run the software—on a disk that always remains in Drive 1. This Family Master List contains the names of every family in the congregation, the addresses, the children, and the special interests or talents of the individual family members.

In Drive 2 can be inserted any of a series of disks that cross-reference their information with the master family data located in Drive 1. For instance, if the user puts the Pledge disk into Drive 2, and calls up a family record by either number or name, the chart requested will be pulled from the disk in Drive 1. Then, the current pledge information—how much was donated and at what date—can be input into the machine,

and can be saved back to the Pledge disk in Drive 2.

The tiresome calculation of the balance remaining on each pledge, how well the overall planned budget is being supported by contributions, and the issuing of accurate quarterly statements have all been simplified. The computer updates the pledge accounts constantly. Doing the pledge statements every quarter used to take four and one-half days every quarter; now it requires about 72 minutes of printer and user time.



here are also other disks that work off the Family Master List the same way the Pledge diskette does. For instance, the Office file allows Vander Kruik to call up family records by inputting a specific interest, such as carpentry. Vander Kruik can then list those people for a possible committee assignment on the maintenance task force. This potential committee makeup would then be saved to the Office disk booted into Drive 2. A printout of the Office disk's data then allows Vander Kruik to send out letters or make phone calls to these prospective volunteers.


The main users of the computer at Grace Methodist are Vander Kruik and Fred Bergen. Both have taken to the machine quickly—Vander Kruik because of his computer background and Bergen because of a series of tutorials he took at the local Radio Shack store. The computer is an important personalized fixture in the church. It has helped accomplish what the congregation set out to do when it first made plans to buy a computer last August; it has freed human beings to perform more important people-oriented tasks like visitations to the sick and personal problem solving, and taken them away from manual chores such as writing out pledge ledgers or thumbing through dog-eared and out-of-date

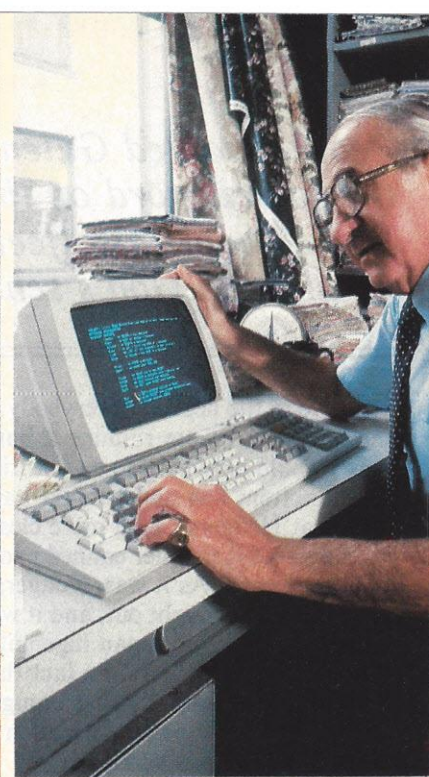
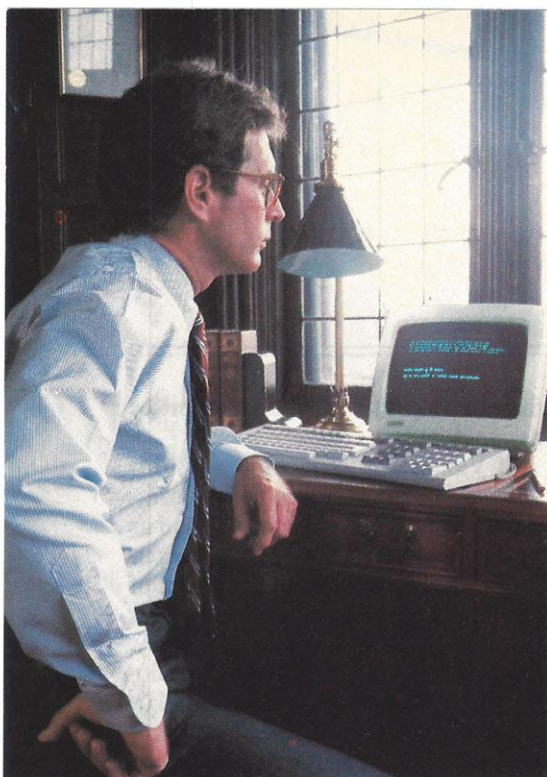
membership lists to set up committee assignments.

If Vander Kruik has his way, this will only be the beginning of the computer's role at the church. As soon as he can convince more of the unconverted church officers of the power of the machine, he intends to use it for printing a church parish directory, keeping track of correspondence, doing full-scale budget planning, and as a teaching or sermon aid. The image he has is of the pastor typing in the question: "What is Hebrews 13.1 and what have been its interpretations?" and getting the response: "Hebrews 13.1: Let brotherly love continue," followed by a five-page printout that details cross-references and the sense behind the words according to theologians.

"Things are changing in churches these days, because a lot of the newer pastors are second-job people," Vander Kruik says. "We've come out of the secular world and understand how it works and what is necessary to keep up with it.

"There is a parallel: People scolded Gutenberg for using that sinful machine for printing the sacred word. In the same way some people feel that computers—modern technology, really—have no place in God's scheme of things, and especially in the church. But I feel the opposite. By organizing and putting our heads together to set up the computer at Grace Methodist, we have just accomplished a proper stewardship of the talents and gifts that we've been given by God."

The spread of personal computers to churches has been so strong that there is even a modicum of status attached to owning the machine for some houses of worship. Take the St. Luke's United Methodist Church in Houston, Texas, where the elders are so computer-hooked that they just spent over \$100,000 on a complete Wang multiuser system. Church officials say proudly, no complaints have yet been raised. 



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There was a time in recent history when people could tolerate the inadequacies of personal computers. We believe that era has ended.

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Even more, you no longer have to be content with a narrow choice of personal computers. For Digital gives you three choices: Rainbow, DECmate, and Professional personal computers. Different kinds of personal computers, because there are different kinds of problems to manage.

So if you've been unhappy with the history of personal computing thus far, be glad. A new generation has begun.

To find out more, call 800-DIGITAL and we'll send you our free personal

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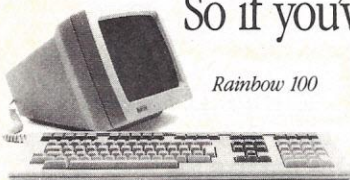
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*The minicomputer of personal computers.*



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*Rainbow 100*

*The low cost high performance machine.*

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# PIE: Writer

## The best microcomputer word processor any money can buy.

**Thousands of dollars worth of word processing performance for just \$149.95**

### Who's saying that?

Arthur Naiman, for one, in the "Word Processing Buyer's Guide" to be published soon by McGraw-Hill.

In his definitive study, Naiman compared 14 major word processing products—and PIE:Writer was among the top three. Its nearest neighbors were dedicated word processors which cost from \$13,500 to

\$15,000. (See a portion of the study results below.) Yet PIE:Writer can be part of your personal computer system for just \$149.95!

So now your business or home microcomputer can have capabilities equivalent to the industry's top machines. Naiman says:

**"PIE:Writer, running on a humble Apple II, out-scored every other word processing program for microcomputers . . . (It) crams an incredible amount of power into a small (23½ K) and inexpensive package . . . PIE:Writer beat four out of six dedicated word processors."**

No other microcomputer word processor earned the ranking that PIE:Writer did. PIE:Writer can make your personal computer into a word processing whiz.

### That's not all.

PIE:Writer has been steadily collecting honors from experts throughout the industry for its all-around price/performance and its many advanced user features.

When *Peelings II* magazine compared 10 micro word processors, PIE:Writer came out on top . . . again. *Peelings II* rated PIE:Writer "AA + " and defined the rating as "... top notch, superb." The review concluded:

**"... a formidable contender in performance to price ratio . . . PIE:Writer is hard to beat."**

And *Interface Age* said in an in-depth review of PIE:Writer's current version:

**"... much has been gained in this update to a time-tested classic."**

	Operating system(s) and/or machine(s)	Price	Overall Score
CPT 8100	dedicated word processor *	\$15,000	94¾
Dictaphone Dual Disp.	dedicated word processor *	\$13,500	85¼
<b>PIE:Writer:</b>	<b>Apple II, IBM PC</b>	<b>\$149.95 \$199.95</b>	<b>84¼</b>
A.B. Dick Magna SL	dedicated word processor *	\$14,500	83
Write	CP/M†	\$400	82¼

\*Includes word processing hardware & multistation support.

†Requires additional CP/M Hardware for your personal computer (\$200-600 extra)

CP/M is a registered trademark of Digital Research

\*VisiCalc © is a registered trademark of VISIcorp

## Why the experts love PIE:Writer.

Why all the fuss?

Here are some of the features reviewers chose as the basis for PIE:Writer's excellent performance, and the reasons why you should choose PIE:Writer:

PIE:Writer is fast in executing functions such as search, scroll, page up and down.

PIE:Writer is easy to learn, with an excellent new set of user documentation.

PIE:Writer is copyable to back-up disks.

PIE:Writer can edit either text or programming code.

PIE:Writer is compatible with a wide range of hardware.

And reviewers note that PIE:Writer has refined the most sought-after editing features:

- ✓ wrap/columnar option
- ✓ text marking
- ✓ global word search & replace
- ✓ custom form letters and mailing lists
- ✓ justify right and left
- ✓ status display
- ✓ save or insert text from another file
- ✓ control page breaks
- ✓ cut and paste
- ✓ "Help" screen
- ✓ forward & backward page scrolling
- ✓ automatic centering
- ✓ full format control
- ✓ control page numbering, bottom and top headers
- ✓ underlining
- ✓ tabbing by word or moveable marks

## You'll love PIE:Writer too.

You'll find everything you need in PIE:Writer. Whatever you write will be easier to do: reports, letters, books and articles, memos and personal notes. Use PIE:Writer with a 40 or 80 column set-up, lower case adapters, hard disks, modems or shift-key modifiers. PIE:Writer works with spelling checkers, Visi Calc\* files and can edit program source files.

PIE:Writer gives you efficiency and capabilities far beyond other word processors. You can save valuable time and be more creative with all your documents. And PIE:Writer is an easy transition for typists as well as writers and managers.

You'll be using PIE:Writer the day you install it on your personal computer. Just a few moments with its built-in training lessons and you're up and running.

The experts use words like "powerful," "clean," "formidable" and "graceful" to describe PIE:Writer. But don't take their words for it. Try PIE:Writer yourself and enjoy the ease and excitement of the top-ranked word processor.

## The Hayden Advantage.

There's another significant reason to love PIE:Writer: it's backed by Hayden Software, a company with the experience and resources to provide solid products; thorough, user-friendly documentation; and full technical support.

PIE:Writer is part of Hayden's growing "Personal Information Environment" family of software products. The PIE family also includes PIE:Speller, a 20,000 word dictionary spelling checker with a user-defined component. And PIE:Communications, which turns your personal computer into a communications center by letting you send and receive text between your computer and others.

Together with Hayden's other Professional Software products, the PIE family helps you make the most of your personal computer in any environment.

Hayden provides a full range of software for your computer, including business, entertainment, educational and technical products. Visit your local dealer and learn about the Hayden advantage.

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**Order Number : 13409**  
**Runs on: Apple II**  
**Price: \$149.95**

**Order Number : 19922**  
**Runs on: IBM PC**  
**Price: \$199.95**

## PIE:Writer. In micro word processors, the best any money can buy.

Available at your local dealer, or call: 1-800-343-1218  
(In Mass., call 617-937-0200)

**HAYDEN SOFTWARE**

# Word Processing: Finding The Right Software

Which word processor is for you? It depends on what you'll do with it, and how much you'll be doing it

*by David Gabel, Senior Editor*

**I**f you don't already have a word processor, you probably can't imagine why you'd need one. If you do have one, you probably wonder how you ever got along without it.

That could describe almost anything in personal computing, from accounting software to Z-cards, but it seems to apply most to word processing. Words are universal. Everyone needs to use them, in spoken and written form. When you have to write words, it's so much easier to process them than to do anything else, that after you've used word processing once, you won't ever want to go back to longhand, typing, or even dictating. Software vendors want you to discover the ease with which you can process the written word, and to that end they have produced a bewildering array of word processors to tempt you. We'll try here to help you sort out the products and make an intelligent choice of word-processing software.

There are hundreds of word processors for personal computers. They come in a bewildering number of types and configurations, and a variety of price ranges. It's tempting to say that the more you pay for a word processor, the better it will be; but bigger isn't necessarily better if you end up paying for features you don't need. The trick is to find the word processor that's right for you.

For example, you'll hear that

WordStar, from MicroPro in San Rafael, Calif., is the best word-processing package around. It got that reputation by having more features than any other personal-computer word processor. It emulates dedicated word processors—computers programmed to do word processing and nothing else—very effectively. It has companion programs like MailMerge, which will handle mailing lists, and SpellStar, which checks spelling and typing. WordStar's menus will guide you through the many functions available in the program. The more familiar you become with the program the less frequently the menus will appear, because you'll learn the function keys and what they do, and you'll have less and less recourse to the menus. No other word processor we know of decides automatically to show or not show its help menus.

Our purpose here is not to tell you all the features of WordStar; the buyer's guide charts do that. Rather our purpose is simply to make you aware of some of the things this "best" program will do. One other thing you should know about this program is the price—about \$500 for the version that runs on the IBM Personal Computer—SpellStar and MailMerge cost more. The message is clear: To get the "best" word-processing program, you have to lay out a bit of cash.

In terms of features and capabilities, WordStar may well be the best program on the market. But maybe you don't need the "best." Maybe you should look at what other word processors have to offer.

At the opposite end of the scale from WordStar are word processors that cost less, but have fewer features. Some of these are called home word processors, probably because they aren't meant to be used in office situations. One example of this kind of package is The Bank Street Writer, from Broderbund Software. The manual that comes with this package says if you have some knowledge of computers you can probably use the program right away, because the instructions are on the screen. The manual is right. I booted up this program and it put me into its WRITE mode where I just started entering text. Correcting text, inserting, erasing, and the other functions are all explained as you get to them, and the program makes it simple to get to them.

There aren't many things you can do with this program, at least if you compare it with WordStar. Still, its features seem to indicate it would be fine for letter writing at home.

How do you find the word-processing

**Word Right** by Structured Systems Group of Oakland, Calif. has a HELP menu that guides word-processing users.

```

H H EEEEE L PFFFF
H H E L P P
HHHHH EEEEE L PFFFF
H H E L P
H H EEEEE LLLLL P

```

This is the first in a series of screens designed to help you learn the Word Right Commands. The keys on the Word Right keyboard not only type characters into a document they also give commands. When used with CONTROL (CTRL) or CONTROL-CMD (CTRL-Z), the keys enter one or more of the Word Right Commands.

Although Word Right has many Special Function Commands, it is easy to use. You should not have to spend time memorizing these Commands before using Word Right. So, SSG has included some special HELP: Key Labels, Reference Card, and this built-in HELP function.

You can request HELP with any Word Right Command from the Start-Up Menu, by selecting option E for HELP. You can also get HELP at any time within any document, by giving the HELP key sequence (CTRL-J), or by selecting H from the COMMAND MENU (CTRL-Z Z H).

.....T.....T.....T.....T.....T.....T.....T.....T.....  
 For a directory of the Word Right HELP screens and how to display them, RETURN.  
 ESC to return to the Start-Up Menu.  
 [U=00/02/10/82/00:05:01]



software that's right for you? The answer isn't simple to put into practice, but here it is: Try the software you plan to buy, to make sure it has the features you've decided you need, and that they can be used in a manner that makes sense to you. Whatever you do, don't assume the computer-store salesman knows what's best for you, because he probably isn't even thinking along those lines. Let me give you an example of what I mean by that.

Shortly after I came to *Personal Computing*, before I knew a lot about personal computers, another computing neophyte and I went to a local computer store to get a word processor. We had Apple II computers, so we at least knew the machine we wanted the software to run on. The salesman asked if he could help, and we said we wanted a word processor for the Apple. "No you don't," was the response. "If you want to do word processing, then you don't want

Apples." We said he probably hadn't understood—we already had Apples. "OK," he said, "then you want WordStar." We asked why, and he said, "It's the best." We asked why, and he said, "Well, everyone says it's the best." He didn't know why this product he was recommending was the best that he could sell. So we asked for a demonstration, and the response was, "Well, I don't have it here." We didn't buy WordStar that day, but here's the point: the salesman took no

## WORD-PROCESSING BUYER'S GUIDE

**AB COMPUTERS**  
252 Bethlehem Pike  
Colmar, PA 18915  
(215) 822-7727  
Papermate/\$40  
Commodore Computers  
CIRCLE 300

**ADVANCED OPERATING SYSTEMS**  
4300 West 62nd St.  
Indianapolis, IN 46268  
(317) 298-5400  
Clean Slate/\$79.95  
TRS-80, Models I&II  
Pen Pal/\$59.95  
Apple II  
CIRCLE 301

**APPLE COMPUTER INC.**  
20525 Mariani Ave.  
Cupertino, CA 95014  
(408) 996-1010  
Apple Writer II-\$195  
Apple II  
Apple Writer III-\$225  
Apple III  
CIRCLE 302

**APPLIED MICROCOMPUTER SYSTEMS**  
Box 150  
Silver Lake, NH 03875  
(603) 367-8004  
Documate/\$395 (\$75 demo)  
HP-85  
CIRCLE 346

**APPLIED RESEARCH & CONSULTING**  
2938 N. Madison Ave.  
Loveland, CO 80537  
(303) 667-7936  
Text85/\$300  
HP-83 or 85  
CIRCLE 347

**ARTSCI INC.**  
5547 Satsuma  
North Hollywood, CA 91601  
(213) 985-2922  
Magic Window II/\$149.95  
Apple II, Iie  
CIRCLE 303

**BATTERIES INCLUDED**  
71 Mc Caul St.  
Toronto, Ont., Canada M5T 2X1  
(416) 596-1405  
PaperClip/\$125  
Commodore 64, PET, CBM  
CIRCLE 304

**BEAMAN PORTER INC.**  
Pleasant Ridge Rd.  
Harrison, NY 10528  
(914) 967-3504  
PowerText/\$399/\$299/\$199  
IBM Personal Computer;  
Apple II; Apple III  
CIRCLE 305

**BRODERBUND SOFTWARE**  
1938 Fourth St.  
San Rafael, CA 94901  
(415) 456-6424  
Bank Street Writer/\$69.95  
Apple-48k, Apple Iie  
CIRCLE 306

**BRUCE & JAMES PROGRAM PUBLISHERS**  
4500 Tuller Road  
Dublin, OH 43017  
(614) 766-0110  
Wordvision/\$49.95  
IBM Personal Computer  
CIRCLE 348

**CHARLES MANN & ASSOCIATES**  
55722 Santa Fe Trail  
Yucca Valley, CA 92284  
(714) 365-9718  
Docuwriter/\$199.95  
Master Text Processor/\$139.95  
Personal Text Processor/\$69.95  
Apple II Plus  
CIRCLE 307

**COMMODORE BUSINESS MACHINES**  
487 Devon Park Dr.  
Wayne, PA 19087  
(215) 687-9750  
Easyscript/\$99.95  
Commodore 64  
CIRCLE 308

**COMPUTER MARKETING SERVICES**  
300 W. Maritton Pike  
Cherry Hill, NJ 08002  
(609) 795-9480  
Wordcraft Ultra/\$545  
Commodore computers  
CIRCLE 309

**COMPUVIEW PRODUCTS**  
1955 Pauline, Suite 200  
Ann Arbor, MI 48103  
(313) 996-1299  
VEDIT/\$150  
IBM Personal Computer; Apple;  
TRS-80; S-100; CP/M, MP/M, or  
MS-DOS systems  
CIRCLE 310

**CORVUS SYSTEMS INC.**  
2029 O'Toole Ave.  
San Jose, CA 95131  
(408) 946-7700  
EdWord/Included with  
Corvus Concept  
CIRCLE 311

**CROMEMCO INC.**  
280 Bernardo Ave.  
P.O. Box 7400  
Mountain View, CA 94039  
(415) 964-7400  
Write Master/\$595  
Cromemco computers  
CIRCLE 312

**DATAMOST**  
8943 Fullbright Ave.  
Chatsworth, CA 91311  
(213) 709-1202  
Write-On/\$129.95  
IBM Personal Computer;  
Apple  
CIRCLE 313

**DESIGNER SOFTWARE**  
3400 Montrose #718  
Houston, TX 77006  
(713) 520-8221  
Palantir/\$450/\$350  
for Apple  
CP/M, MP/M, MS-DOS,  
CP/M-86  
CIRCLE 314

**HAYDEN SOFTWARE COMPANY**  
600 Suffolk St.  
Lowell, MA 01853  
P.I.E. Writer/\$149.95-\$199.95  
Apple II, Apple II Plus;  
IBM Personal Computer  
CIRCLE 315

**HEWLETT-PACKARD**  
3003 Scott Blvd.  
Santa Clara, CA 95050  
(408) 988-7095  
Word 100/\$500  
WordStar 100/\$500  
HP-125, 120  
CIRCLE 349

**HUMAN ENGINEERED SOFTWARE**  
71 Park Lane  
Brisbane, CA 94005  
(415) 468-4110  
HES Writer/\$39.95  
Commodore 64, VIC-20  
CIRCLE 350

**IBM**  
Contact your local authorized  
IBM Personal Computer dealer  
(800) 447-4700  
Easy Writer 1.1/\$175  
IBM Personal Computer  
CIRCLE 316

**I.J.G.**  
1953 W. 11th St.  
Upland, CA 91786  
(714) 946-5805  
Electric Pencil/\$89.95  
TRS-80 Models I&II;  
LNW-80  
CIRCLE 317

**INFORMATION UNLIMITED SOFTWARE**  
2401 Marinship Way  
Sausalito, CA 94965  
(415) 331-6700  
Easy Writer II/\$350  
IBM Personal Computer;  
TI Professional Computer  
CIRCLE 318

**KENSINGTON MICROWARE LTD.**  
919 Third Ave.  
New York, NY 10022  
(212) 486-7707  
Format II/\$250  
Apple II Plus  
CIRCLE 319

**LEXISOFT**  
P.O. Box 1378  
Davis, CA 95616  
(916) 758-3630  
Spellbinder/\$495  
CP/M, MP/M, OASIS,  
MS-DOS, PC-DOS  
including Apple  
CIRCLE 320

**LIFETREE SOFTWARE INC.**  
177 Webster St., Suite 342  
Monterey, CA 93940  
(408) 659-3221  
Volkswriter/\$195  
IBM Personal Computer  
CIRCLE 321

**LJK ENTERPRISES INC.**  
P.O. Box 10827  
St. Louis, MO 63129  
(314) 846-6124  
Letter Perfect/\$149.95-\$199.95  
Apple II, II Plus; Atari 400,800  
CIRCLE 322

*Try the software you  
plan to buy to make sure  
it has the features  
you've decided you need.*

time to determine our needs. We didn't need a program with WordStar's sophistication, and if the salesman had taken the time to find out what we needed, he probably could have made a sale of a different product. Instead he was trying to make a sale of an expensive product, and one that would have required the purchase of more hardware (an 80-column card, a CP/M card) to make it work for us.

You'll find a complete listing of

word-processing features in the comparison charts that accompany this article. We won't take the space to discuss all of these but there are some basics you should know.

First of all, word processors are made up of two parts—text editors and text formatters. In general, editors allow for the input and correction of text, while formatters output the text to some peripheral device as the text will appear in final printed form. Text editors must have some kind of

cursor control to allow you to get from one place to another within the document. They should also be screen oriented, which means each character on the screen represents a character in memory, and that changes on the screen are also made in memory at the same time. The opposite of a screen-oriented text editor is a line-oriented editor, which accepts whole lines of text and stores them in memory, instead of individual characters.

MARK OF THE UNICORN  
P.O. Box 423  
Arlington, MA 02174  
(617) 489-1387  
The Final Word/\$300  
Any 56k CP/M system;  
IBM Personal Computer  
CIRCLE 323

METASOFT CORP.  
711 E. Cottonwood, Suite E  
Casa Grande, AZ 85222  
(602) 836-0268  
The BENCHMARK/\$499.95  
CP/M, CP/M-86, MS-DOS  
CIRCLE 324

MICROPRO INTERNATIONAL  
33 San Pablo Ave.  
San Rafael, CA 94903  
(415) 499-1200  
WordStar/\$495  
Apple II; IBM Personal  
Computer  
CIRCLE 325

MILLER MICROCOMPUTER SERVICES  
61 Lake Shore Road  
Natick, MA 01760  
(617) 653-6136  
FORTHWRITE/\$175  
TRS-80 Models I & III;  
IBM Personal Computer  
Requires MMS-FORTH  
CIRCLE 351

MUSE SOFTWARE  
347 N. Charles St.  
Baltimore, MD 21201  
(301) 659-7212  
Super-Text Professional/\$175  
Apple; IBM Personal Computer  
Super-Text Home/Office/\$125  
Apple; Atari 800  
CIRCLE 326

NEC HOME ELECTRONICS (USA) INC.  
1401 Estes Ave.  
Elk Grove Village, IL 60007  
(312) 228-5900  
NEC Word Processing/\$495  
Phantom Pen/\$99.95  
NEC computers  
CIRCLE 327

NEMCO  
9 Walnut St.  
Rutherford, NJ 07070  
(201) 933-4933  
Word Flex/\$140  
IBM Personal Computer  
CIRCLE 356

NORELL DATA SYSTEMS CORP.  
3400 Wilshire Blvd.  
P.O. Box 70127  
Los Angeles, CA 90010  
(213) 257-2026  
Easyword Processing System/\$149.95  
IBM Personal Computer  
CIRCLE 352

NORTH STAR COMPUTERS  
14440 Catalina St.  
San Leandro, CA 94577  
(415) 357-8500  
NorthWord/\$199  
NorthWord II/\$499  
North Star computers  
CIRCLE 328

PEACHTREE SOFTWARE  
3 Corporate Square #700  
Atlanta, GA 30329  
(404) 239-3000  
PeachText/\$500  
CP/M, Z-80 or 8080 and 8085  
CIRCLE 329

PERFECT SOFTWARE  
1400 Shattuck Ave.  
Berkeley, CA 94709  
(415) 644-3001  
Perfect Writer/\$495  
CP/M, MS-DOS, CP/M-86  
CIRCLE 330

PROFESSIONAL SOFTWARE INC.  
51 Fremont St.  
Needham, MA 02194  
(617) 444-5224  
WordPlus-PC/\$395  
IBM Personal Computer  
WordPro 4 Plus/\$450  
Commodore 8000/9000 Series  
WordPro 3 Plus/64/\$89.95  
Commodore 64  
CIRCLE 331

PROSOFT  
Box 560  
North Hollywood, CA 91603  
(213) 764-3131  
NEWSSCRIPT/\$124.95  
TRS-80 Models I & III  
CIRCLE 332

QUARK  
2525 W. Evans, Suite 220  
Denver, CO 80219  
(303) 399-1096  
Word Juggler/\$295  
Apple ///  
CIRCLE 333

QUICK BROWN FOX INC.  
548 Broadway, Suite 4F  
New York, NY 10012  
(800) 547-5995, Ext. 194  
Quick Brown Fox/\$65  
Commodore 64 & VIC-20;  
CP/M, MS-DOS  
CIRCLE 334

RACET COMPUTERS  
1330 N. Glassell, Suite M  
Orange, CA 92667  
(714) 997-4950  
Electric Pencil/\$99.95  
NEC PC-8000, 6000  
CIRCLE 335

RADIO SHACK  
1500 One Tandy Center  
Fort Worth, TX 76102  
(806) 390-2793  
Scriptit & Scriptit 2.0/\$399  
TRS-80 Model II or 16  
SuperScriptit/\$199  
TRS-80 Models I & III  
CIRCLE 336

SATELLITE SOFTWARE INT'L.  
288 W. Center  
Orem, UT 84057  
(801) 224-8554  
Word Perfect/\$495  
IBM Personal Computer  
CIRCLE 353

SELECT INFORMATION SYSTEMS  
919 Sir Francis Drake Blvd.  
Kentfield, CA 94904  
(415) 459-4003  
Select/\$595  
CP/M systems  
CIRCLE 337

SIERRA ON-LINE INC.  
36575 Mudge Ranch Rd.  
Coarsegold, CA 93614  
(209) 683-6858  
Screenwriter II/\$129.95  
Apple II, II Plus  
CIRCLE 338

SOF/SYS INC.  
4306 Upton Ave. S.  
Minneapolis, MN 55410  
(612) 929-7104  
The Executive Secretary/\$250-\$494  
Executive Secretary Plus/\$250-\$494  
Apple II Plus; IBM Personal Computer;  
Olivetti M20; CP/M  
CIRCLE 339

SOFTWARE PUBLISHING CORP.  
1901 Landings Dr.  
Mountain View, CA 94043  
(415) 962-8910  
PFS: Word/\$100-\$150  
IBM Personal Computer;  
Apple ///  
CIRCLE 340

SOFTWARE TOOLWORKS  
15233 Ventura Blvd., Suite 1118  
Sherman Oaks, CA 91403  
(213) 986-4885  
PIE (editor)/\$29.95  
TEXT (formatter)/\$39.95  
Heath-Zenith; CP/M  
with Heath-Zenith terminals  
CIRCLE 354

SORCIM CORPORATION  
2310 Lundy Ave.  
San Jose, CA 95131  
(408) 942-1727  
SuperWriter/\$395  
CP/M, CP/M-86, PC-DOS,  
MS-DOS, MP/M-86, 8080,  
8085, Z-80, 8088, 8086  
CIRCLE 341

STRUCTURED SYSTEMS GROUP  
5204 Claremont  
Oakland, CA 94618  
(415) 547-1567  
Word Right/\$494  
CP/M systems  
CIRCLE 342

TEXAS INSTRUMENTS INC.  
P.O. Box 10508  
Lubbock, TX 79408  
(800) 858-4565  
TI Writer/\$99.95  
TI-99/4A Home Computer  
CIRCLE 343

THRESHOLD SOFTWARE INC.  
1832 Tribute Road, Suite E  
Sacramento, CA 95815  
(916) 920-8189  
Write/Idea/\$250-\$300  
HP Series 80  
CIRCLE 355

VECTOR GRAPHIC INC.  
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Thousand Oaks, CA 91320  
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Vector Graphic: Vector 3, 4, 5 series,  
CP/M  
CIRCLE 344

VISICORP  
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San Jose, CA 95134  
(408) 946-9000  
VisiWord/\$375  
IBM Personal Computer  
CIRCLE 345

# WHILE YOU WAITED FOR THE RIGHT HARDWARE, WE DEVELOPED THE RIGHT SOFTWARE.

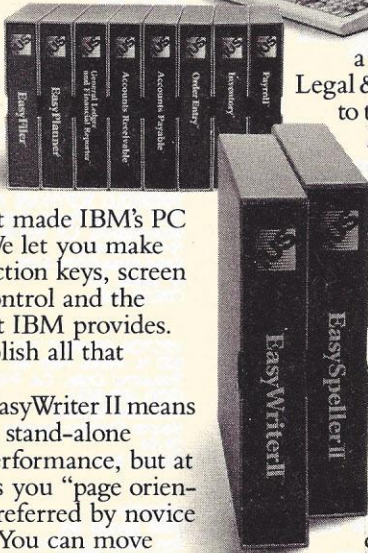
Choosing IBM's Personal Computer from all the rest was the right choice.

You need to show the same discriminating taste in choosing the right software.

We make that choice easy.

Our EasyFamily software is written specifically for your IBM PC, and designed to take full advantage of all the features that made IBM's PC the right choice. We let you make full use of the function keys, screen graphics, cursor control and the built-in power that IBM provides. We let you accomplish all that very easily.

Simply adding EasyWriter II means that you now have stand-alone wordprocessing performance, but at a PC price. It gives you "page orientation," a feature preferred by novice and veteran alike. You can move blocks of text with just a few keystrokes. Move a letter, a word, a line, a page, a paragraph, instantly.



Adding EasySpeller II to your IBM PC, gives you an 88,710 word vocabulary that can be consulted with a single keystroke

to check a word, a line or a page. (You may opt for Webster's Legal & Medical Word Lists in addition to the 88,710 word vocabulary.)

EasySpeller II doesn't just catch spelling errors, it also helps even the best speller find those embarrassing typos.

You get dramatic results when you combine EasyWriter II with EasySpeller II, and add them both to your IBM PC. They let you check suspect words as you write, or the entire document when finished. All without changing programs — and the only current micro-computer software that offers this capability.

All our programs are easy to learn, easy to use and easy to buy. We make your work simpler, easier

**EasyWriter II**  
**EasySpeller II**  
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**EasyPlanner**  
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- General Ledger and Financial Reporter
- Accounts Receivable
- Accounts Payable
- Order Entry
- Inventory Control and Sales Analysis
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and more productive. So make it easy on yourself. See EasyWriter II and EasySpeller II at ComputerLand, Sears Business Centers and authorized independent IBM Dealers. For more information, call (415) 331-6700, or write Information Unlimited Software, Inc., 2401 Marinship Way, Sausalito, CA 94965.



## *A demonstration will clear up a lot of your confusion about word processing.*

## **SPECIAL REPORT**

A text editor should also have a live screen. This means changes can be made in the text "on the fly." If the screen isn't live, your word processing will be slower. Easy Writer Professional, P.I.E. Writer, and WordStar all have live screens.

If a text editor doesn't have a live screen, the program will be limited. The Bank Street Writer doesn't have a live screen, and when you're in the WRITE mode that's all you can do—write, or enter text.

P.I.E. Writer, with its live screen, however, lets you do all these things in what it calls EDIT mode. You can be entering text and decide you want to go back to the beginning to find out where you are, and it's a simple control-key sequence. You can also enter and delete text, editing as you go. After you've used a live screen, a dead one seems a real bother.

### ***Seeing is believing***

Akin to the question of live screen is the need to see what the word processor will actually do with your words. Some text editors, like WordStar's, let you see just what your document will look like when it's printed. Not being able to see what your text will look like can be very annoying, especially if you're working with tabular data or the like. With P.I.E. Writer, you make use of very powerful formatting commands embedded in the text to position words on the printed page. But the only way you can see the result is to load the text formatter and have the program print your text on the screen. It's a time-consuming business, and one you'd probably not have to put up with, other things being equal. Of course, editors that use this formatting style will allow you to put text on the screen exactly as it will appear on the page, but to do that you have to turn formatting off.

### ***An extra set of keys?***

There's a certain amount of controversy in the word-processing commu-

nity about the next feature—dedicated function keys. Function keys are dedicated keys that perform unique functions on the keyboard. Cursor control is perhaps the most familiar of the dedicated functions. There are others. The IBM Personal Computer has 10 function keys along the left side of the keyboard. Some of these keys could be used for special functions, like word delete and block move. If the word-processing package you're considering makes use of these keys for such word-processing functions, you might be happy that you have no need to memorize compound-key commands, like ESC followed by CTRL-SHIFT-N, which tells P.I.E. Writer to delete the line.

On the other hand, a skilled typist might find the function keys a bother, and prefer to use the compound keys, because he is used to the position of the letter keys on the keyboard. Since most professionals and businessmen probably aren't skilled typists, they probably won't be concerned with slowing their speed, and will prefer a package that makes use of dedicated function keys.

A package that runs on the Apple and other simple systems won't use dedicated function keys, because these systems' keyboards don't have them. Some packages for other systems, like Select for the NEC PC-8001, running under CP/M, makes use of the system's cursor-control keys. It also gives you the option of a clicking keyboard, if you want audible feedback.

Since we've mentioned the Apple and other simple systems, let's talk about them for a minute. Systems like this have hardware limitations, the most severe of which is probably the 40-column or less display. Readers have taken us to task for stating that 80 columns of display are de rigueur for word processing. These readers claim to be using every computer under the sun for word processing, some with as few as 32 columns appearing on the screen. One reader even says he uses

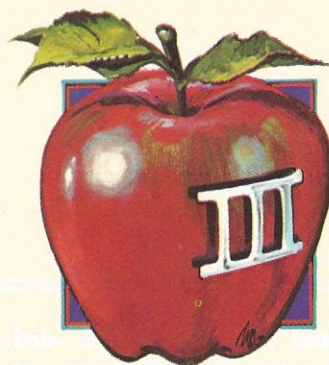
### **THE SECRETARY CONNECTION**

**Y**ou may think you have no need for a word processor that can do everything except mix martinis at the office Christmas party. You may be wrong.

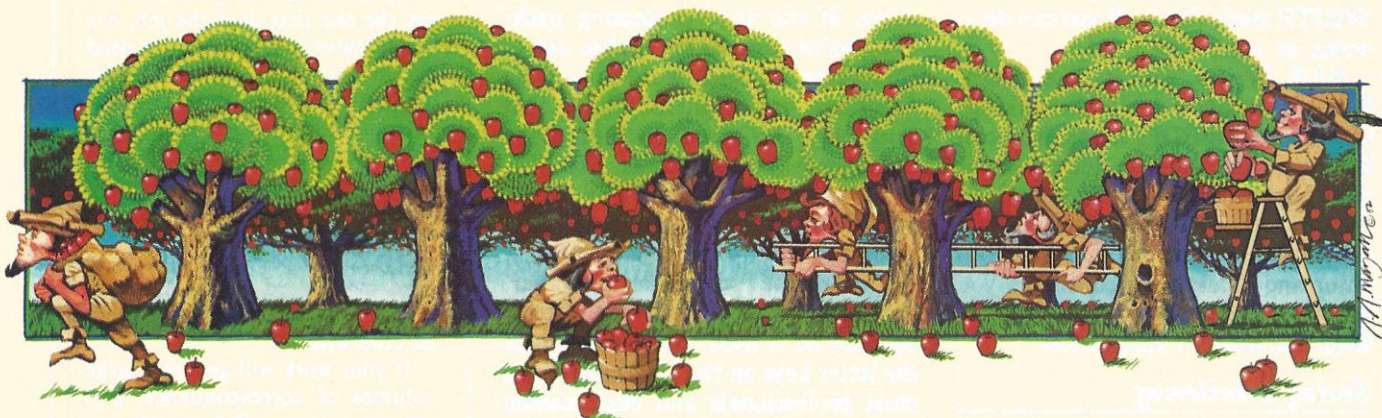
The whole point of the search for a software product for your computer is suitability. You should get the one that does the job, has the features you're likely to need over a reasonable period of time, and that you can afford. The first two qualifications are sometimes difficult to determine. If, for example, you work with a secretary continually, like Marshall Graham does (see *The Modern Management Team*, page 89), you may need more word-processing capabilities than you would have needed otherwise.

If your work will generate large volumes of correspondence, and your secretary will be producing the final versions of that correspondence, then you and your secretary should have the same word processor, and that processor should have all the features your secretary will need. That means it probably should be able to put out form letters against a mailing list. And it will probably need a spelling checker, not necessarily because your assistant can't spell, but to take care of jargon and technical terms.

Don't think you can get away with a processor for yourself that's less comprehensive than the one your secretary uses, because you may find you didn't get all the capabilities you need. Suppose, for example, your secretary has taken your document and inserted columnar material into it at your instruction, using fairly complicated tabbing and number justification. If your word processor can't do the same thing to the file when you proof it prior to final production, then you'll have to add another step in the write-edit-correct cycle if you catch an error.



# Quark turns your Apple III into an orchard.



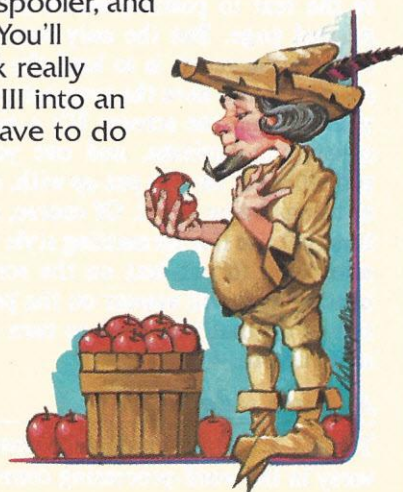
You can get the most out of your Apple\* III with office automation software from Quark. In fact, our integrated line of technically advanced products can dramatically increase your system's capabilities.

And all Quark programs combine this leading-edge technology with a singular innovation: simplicity of operation. Because we think software should present challenges to the developer, not to the user.

This approach to product design is clearly evident in our Word Juggler<sup>™</sup> word processor. And since you can enhance Word Juggler with special accessory programs, you'll have ample opportunities to discover that productivity is not merely a cliché.

Just add our Lexicheck<sup>™</sup> spelling checker, for instance. Or our new Terminus<sup>™</sup> communications program; ideal for interfacing Apple IIIs. And perfect for electronic mail applications.

Your dealer is waiting to give you a comprehensive demonstration of our complete word processing system. Plus other Quark products, too, such as our Catalyst<sup>™</sup> hard disk boot, Discourse<sup>™</sup> software spooler, and more. See him today. You'll quickly find that Quark really does turn your Apple III into an orchard. So all you'll have to do is shake the trees.



## Quark<sup>™</sup>

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CIRCLE 41

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*After you've used word processing, you won't ever want to go back to longhand or typing.*

VisiCalc as a word processor.

We concede that word-processing display is possible using fewer than 80 columns, but we further submit that in professional applications, like office-correspondence typing, 80 columns are a must. At home, with light use, you can easily get by with less.

### **Friendly files**

To be most useful, a word processor should be able to access files used by your other programs. And the reverse should be true—other programs you have should be able to use your word processor's files.

The ultimate in this kind of program-file compatibility is provided by integrated software packages, like MBA from Context Management, and 1-2-3 from Lotus Development. These packages are designed to let different applications use the same files. But file compatibility is an issue even if you choose not to use one of these integrated packages.

We at *Personal Computing* first ran into the file-compatibility problem when we tried to get word processing up and running at all. We knew we would need to send to several possible locations, because *Personal Computing's* staff is spread across the country. So we were looking for a word processor that would not only be easy to use, but would store its information in files a data-communications program could use. We had quite a time finding one to fill the bill.

A product called Super Script, (now Screenwriter from Sierra On-Line) seemed a good bet because it gave our Apples the capability of showing lowercase letters without adding hardware. But it did something funny with its files, so we weren't able to get our data-communications program to pick up the files, although Apple DOS could catalog them.

Then we got Easy Writer Pro, from IUS in Sausalito, Calif. This pro-

*(continued on page 171)  
(chart begins on next page)*

### **EVERYMAN'S WORD PROCESSOR**

**S**ome people are just hard to convince, and if you're one of them, you may read this word-processing buyer's guide and say, "I just don't think I'll ever need one of those programs."

If that's the case, you can still use your computer as a text editor. The nice thing about personal computers is their versatility. There are probably infinite ways you can get text into and out of a computer. You may have trouble getting the text formatted in a nice fashion for printing, but for a lot of people that's not important. If all you need is to put text onto paper for reminder purposes, say, or for internal memos whose appearance is inconsequential, then the following method might work for you.

- The BASIC Editor Trick. BASICs have text editors for editing programs. Some of these editors, like Applesoft's, are awfully tough to use. Others are easy. In any case, if you wanted to use a BASIC editor as a text editor, you would need to enter each line of text preceded by a line number. BASIC doesn't care what you input to it in deferred execution mode (that is, statements preceded by a line number, as are program statements) until run time. If you try to run a "program" that consists of a memorandum to the sales staff, all you'll get is SYNTAX ERROR. But if you list it, you'll have no problem. What follows is an example of using Applesoft as a text editor.

```
]THESE ARE THE TIMES THAT  
TRY MEN'S SOULS—THE SUM-  
MER SOLDIER  
?SYNTAX ERROR  
]AND THE SUNSHINE  
PATRIOT.  
?SYNTAX ERROR  
]JOH, I SEE. THE COMPUTER  
WILL PRINT SYNTAX ERROR  
IF THERE'S NO  
?SYNTAX ERROR  
]PROGRAM LINE NUMBER.  
?SYNTAX ERROR  
]TRY THIS
```

```
?SYNTAX ERROR  
]10 THESE ARE THE TIMES  
THAT TRY MEN'S  
]20 SOULS—THE SUMMER SOL-  
DIER AND THE SUNSHINE  
PATRIOT.  
]LIST
```

```
10 THESEARETHETIMESTH AT  
TRYMEN'S
```

```
20 SOULS—THESUMMER  
SOLDIER AND THESUNSHINEP  
AT RIOT.
```

```
]JOH, I SEE. THE APPLE EDITOR  
LIKES TO PARSE EXPRESSIONS  
TO SUIT
```

```
?SYNTAX ERROR  
]ITSELF. WELL, TRY THIS.
```

```
?SYNTAX ERROR  
]10 "THESE ARE THE TIMES  
THAT TRY MEN'S SOULS—  
]20 THE SUMMER SOLDIER  
AND THE SUNSHINE PATRIOT.  
]LIST
```

```
10 "THESE ARE THE TIMES  
THAT TRY MEN'S SOULS—  
20 THESUMMERSOLDIER AND  
THESUNSHI NEP AT RIOT.
```

```
]FORGOT THE QUOTES IN THE  
SECOND STATEMENT. TRY  
AGAIN
```

```
?SNYNTAX ERROR  
]10 "THESE ARE THE TIMES  
THAT TRY MEN'S SOULS"  
]20 "THE SUMMER SOLDIER  
AND THE SUNSHINE  
PATRIOT."
```

```
]LIST  
10 "THESE ARE THE TIMES  
THAT TRY MEN'S SOULS"  
20 "THE SUMMER SOLDIER  
AND THE SUNSHINE  
PATRIOT."
```

```
]30 "AS YOU SEE, YOU CAN USE  
THE APPLESOFT"
```

```
]40 "EDITOR TO GENERATE  
SIMPLE MEMOS TO YOUR-  
SELF. BUT IT'S TOUGH."
```

```
]LIST 30-  
30 "AS YOU SEE, YOU CAN USE  
THE A PPLESOFT"
```

```
40 "EDITOR TO GENERATE  
SIMPLE MEM OS TO YOUR-  
SELF. BUT IT'S TO UGH."
```

# Word-Processing Editing Features

COMPANY/ PACKAGE	HYPHENATION	SCROLL FUNCTIONS Vertical	Horizontal	JUMP FEATURES Text Beginning	Text Ending	New Screen/Next Page	Previous Screen	Middle of the Screen	End/Beginning Line	BLOCK FEATURES Copy	Merge	Move	INSERT FEATURES Character	Block	Line	Word	Word wrap
AB COMPUTERS Papermate	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•
ADVANCED OPERATING SYSTEMS Clean Slate		•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
Pen Pal	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
APPLE COMPUTER INC. Apple Writer //		•	•	•	•			•		•	•	•	•	•	•	•	•
Apple Writer ///		•	•	•	•			•		•	•	•	•	•	•	•	•
Apple Writer ///		•	•	•	•			•		•	•	•	•	•	•	•	•
APPLIED MICROCOMPUTER SYSTEMS Documate		•		•	•							•	•				
APPLIED RESEARCH & CONSULTING Text85		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ARTSCI INC. Magic Window II	•	•	•	•	•	•	•	•		•	•		•	•	•	•	•
BATTERIES INCLUDED PaperClip	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BEAMAN PORTER INC. PowerText-IBM		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
PowerText-Pascal		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PowerText-Run-Time		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BRODERBUND SOFTWARE Bank Street Writer		•		•	•						•	•	•	•	•	•	•
BRUCE & JAMES PROGRAM PUBLISHERS Wordvision	•		•	•	•	•		•	•	•	•	•	•	•	•	•	
CHARLES MANN & ASSOCIATES Docuwriter		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Master Text Processor		•	•		•	•	•	•	•	•	•	•	•		•	•	•
Personal Text Processor		•	•		•	•	•	•	•	•	•	•	•		•	•	•
COMMODORE BUSINESS MACHINES Easyscript	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
COMPUTER MARKETING SERVICES Wordcraft Ultra	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
COMPUVIEW PRODUCTS VEDIT		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
CORVUS SYSTEMS INC. EdWord	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
CROMEMCO INC. WriteMaster	•	•	•	•	•	•	•		•	•	•	•	•	•	•		•
DATAMOST Write-On-Apple		•		•	•	•	•	•		•	•	•	•	•	•	•	•
Write-On-IBM		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
DESIGNER SOFTWARE Palantir	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
HAYDEN SOFTWARE COMPANY P.I.E. Writer-Apple		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•
P.I.E. Writer-IBM		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•
HEWLETT-PACKARD Word 100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WordStar 100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
HUMAN ENGINEERED SOFTWARE HES Writer		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
IBM Easy Writer 1.1		•	•	•	•	•	•		•	•	•	•	•		•		•
I.J.G. Electric Pencil		•		•	•				•	•	•	•	•	•	•		
INFORMATION UNLIMITED SOFTWARE Easy Writer II		•	•		•	•	•		•	•	•	•	•	•	•	•	•
KENSINGTON MICROWARE LTD. Format II		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LEXISOFT Spellbinder	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LIFETREE SOFTWARE INC. Volkswriter		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
LUK ENTERPRISES INC. Letter Perfect		•		•	•	•	•		•	•	•	•	•	•	•		•

(continued)

# SPECIAL REPORT

(continued)

## WORD-PROCESSING EDITING FEATURES

COMPANY/ PACKAGE	HYPHENATION	SCROLL FUNCTIONS Vertical	Horizontal	JUMP FEATURES Text Beginning	Text Ending	New Screen/Next Page	Previous Screen	Middle of the Screen	End/Beginning Line	BLOCK FEATURES Copy	Merge	Move	INSERT FEATURES Character	Block	Line	Word	Word wrap
MARK OF THE UNICORN The Final Word	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
METASOFT CORPORATION The BENCHMARK Word Processor 3.0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MICROPRO INTERNATIONAL WordStar	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MILLER MICROCOMPUTER SERVICES FORTHWRITE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MUSE SOFTWARE Super-Text Professional	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Super-Text Home/Office	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NEC HOME ELECTRONICS NEC Word Processing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Phantom Pen	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NEMCO Word Flex	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NORELL DATA SYSTEMS CORP. Easyword Processing System (incl. Easyedit, Easytext, Easyproof)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NORTH STAR COMPUTERS NorthWord	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NorthWord II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PEACHTREE SOFTWARE PeachText	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PERFECT SOFTWARE Perfect Writer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROFESSIONAL SOFTWARE INC. WordPlus-PC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WordPro 4 Plus	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WordPro 3 Plus/64	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROSOFT NEWSCRIP	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
QUARK Word Juggler	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
QUICK BROWN FOX INC. Quick Brown Fox	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RACET COMPUTERS Electric Pencil	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RADIO SHACK SuperSCRIPT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCRIPT 2.0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCRIPT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SATELLITE SOFTWARE INT'L. Word Perfect	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SELECT INFORMATION SYSTEMS Select	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SIERRA ON-LINE INC. Screenwriter II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOF/SYS INC. The Executive Secretary	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Executive Secretary Plus	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOFTWARE PUBLISHING CORP. PFS:WORD	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOFTWARE TOOLWORKS PIE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SORCIM CORPORATION SuperWriter	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STRUCTURED SYSTEMS GROUP Word Right	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TEXAS INSTRUMENTS INC. TI Writer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
THRESHOLD SOFTWARE INC. Write/Idea	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VECTOR GRAPHIC INC. Memorite III	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VISICORP VisiWord	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

*It's tempting to say that the more you pay for a word processor, the better it will be. But it isn't necessarily so.*

[illegible]

(continued on page 124)

# CALL "THE COMPUTER-LINE" In Colorado.

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The Computer-Line believes that it is important to be competitive by offering low prices; however, we regard service as the most important aspect of a mail-order organization. All our lines are available so that you, the customer, are able to talk to fully qualified computer specialists trained to answer all your questions pertaining to our line of micro-computers. We are renowned for our excellent after-sales support and our promptness for delivery. Peace of mind and excellence in service is our pledge to all our customers.

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★ Double Side/ ★  
★ Double Density ★  
★ 320K Bytes ★  
★ of Storage. ★  
★ TM-100-2 ★  
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★ Instruments. We can ★  
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★ price Dealers & Manf. ★  
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★ volume pricing. ★

## QUADRAM CORPORATION

**Quadboard:** The memory board for the IBM featuring:

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- Asynchronous (RS232) Serial Port
- Clock/Calendar
- RAM Disk Drive..... \$CALL

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- Buffering from 8K - 64K (4 - 32 pages of text)
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- Parallel/Parallel; Parallel/Serial; Serial/Serial available
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### Continental:

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### Denver Software:

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Rose Data Base..... \$259.00

Service Manager..... \$1395.00

### Sorcim Software:

Supercalc..... \$199.00

Superwriter..... \$299.00

Spellguard..... \$149.00

### Lifetree Systems:

Volkswriter..... \$149.00

### Visicorp:

256K Visicalc..... \$185.00

Visidex..... \$185.00

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Use ASCII Express The Professional 4.0 to simultaneously transfer data from modem to printer using the VIP Card.

ASCII EXPRESS (The Professional)..... \$99

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Works with DB Master and Visidex Mountain Computer mode.

Basic and pascal operation complete with datebook software..... \$ 85

### RAM CARDS

Microsoft 16K..... \$79<sup>00</sup>

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Select A Port..... \$44<sup>00</sup>

Game Paddles..... \$29<sup>00</sup>

### Kraft:

Joysticks..... \$49<sup>00</sup>

Game Paddles..... \$33<sup>00</sup>

### 80 Column Cards

Videx with Softswitch..... \$279<sup>00</sup>

### WORD PROCESSING SPECIALS

On Line Screenwriter \$85 Pro \$149

Silicon Valley Word Handler \$119

## APPLE SOFTWARE

### Continental:

The Home Accountant..... \$154

### Silicon Valley Systems:

Word Handler..... \$119

List Handler..... \$ 59

### Stoneware:

DB Master..... \$ 59

DB Utility 1, 2, 3..... \$69<sup>00</sup> e

### Visicorp:

Visicalc 3.3..... \$185

Visifiles..... \$185

Visidex..... \$185

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### Denver Software:

Financial Partner..... \$149

Pascal Tutor..... \$ 89

Pascal Programmer..... \$199

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PRICES.

Call For Prices On Apple Iie Basis 108 Computers and Franklin Ace 1000 / 1200 Computers.

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## Peripherals for all Computers

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Amdek	Color I.....	\$299 <sup>00</sup>
	Color II.....	\$699 <sup>00</sup>
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	300A Amber.....	\$159 <sup>00</sup>
	310G Green.....	\$179 <sup>00</sup>
BMC	310A Amber.....	\$179 <sup>00</sup>
	15MHZ Green.....	\$ 85 <sup>00</sup>
	20MHZ Green.....	\$149 <sup>00</sup>
NEC	1201 Green.....	\$159 <sup>00</sup>
	1212 Color Composite.....	\$299 <sup>00</sup>
	1203 RGB Hi-Res Color.....	\$679 <sup>00</sup>
Zenith	ZVM-121 15MHZ.....	\$109 <sup>00</sup>
Taxon	Amber.....	\$145 <sup>00</sup>

## ACCESSORIES

### T and G Products:

(IBM) Trac Ball..... \$45<sup>00</sup>

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CIRCLE 47

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**TERMS:** All prices reflect a 2.9% cash discount. All goods acknowledged faulty on receipt by the customer will be repaired or replaced at our discretion. Customers must call for a RMA number before returning any goods. This facilitates our quick attendance to faulty goods. We reserve the right to repair or return to the manufacturer for repair all goods becoming faulty within the specified warranty period. Any goods (hardware or software) returned for restocking are subject to a 10% restocking fee at our discretion. No returns on software. We accept no responsibility for any false claims made by manufacturers. Prices quoted for stock on hand and subject to change without notice. Specialists in APO and international deliveries. Please add 2% (minimum \$3.00) for shipping APO and add to all prices 5% for shipping (minimum \$5.00). Please allow 10 working days plus mail time (if an order is mailed) in for receipt of all UPS delivered goods. All goods (other than APO or international) delivered UPS ground.

ALL BRANDS ARE REGISTERED TRADEMARKS

## DISKETTES

**\*\*Kangaroo:** The disks with the 'jump' on the competition. Outstanding value with library case and a ten year warranty.

5 1/4" SS/DD (Box of 10)..... \$19<sup>95</sup>

5 1/4" DS/DD (Box of 10)..... \$28<sup>95</sup>

### Verbatim Diskettes

5 1/4" SS/DD (Box of 10)..... \$23<sup>95</sup>

5 1/4" DS/DD (Box of 10)..... \$43<sup>95</sup>

8" SS/DD (Box of 10)..... \$39<sup>95</sup>

8" DS/DD (Box of 10)..... \$44<sup>95</sup>

### Elephant Diskettes

5 1/4" SS/DD (Box of 10)..... \$22<sup>95</sup>

5 1/4" DS/DD (Box of 10)..... \$29<sup>95</sup>

## MODEMS

D.C. Hayes: Micromodem II (Apple) w/ Terminal Program..... \$289<sup>00</sup>

Micromodem II (Apple) w/o Terminal Program..... \$259<sup>00</sup>

Smartmodem 300 Baud..... \$209<sup>00</sup>

Smartmodem 1200 Baud..... \$525<sup>00</sup>

Novation: J-Cat RS232 Direct Connect..... \$119<sup>00</sup>

Cat..... \$149<sup>00</sup>

Smart Cat 1200 Baud..... \$455<sup>00</sup>

Applecot II (Apple)..... \$289<sup>00</sup>

## PRINTERS

### TEC / C-ITOH Printers

Prowriter I Parallel..... \$37<sup>95</sup>

Prowriter I Parallel/Serial..... \$49<sup>95</sup>

Prowriter II Parallel..... \$64<sup>95</sup>

Prowriter II Parallel/Serial..... \$69<sup>95</sup>

### F10 Starwriter Letter Quality

40 CPS Printer, Diablo Standard Daisywheel..... \$119<sup>95</sup>

### F10 Printmaster 55 CPS

Okidata..... \$CA

Microline 92: 160 CPS bidirectional with 40 CPS correspondence. 80 column..... \$57<sup>95</sup>

Microline 93: 160 CPS bidirectional with 40 CPS correspondence. 132 column..... \$99<sup>95</sup>

Pacemark 2350: 350 CPS bidirectional/2 color printing/136 column..... \$219<sup>95</sup>

Parallel..... \$229<sup>95</sup>

Serial..... \$229<sup>95</sup>

Pacemark 2410: 350 CPS bidirectional/2 color printing/85 CPS correspondence..... \$249<sup>95</sup>

Parallel..... \$259<sup>95</sup>

Serial..... \$259<sup>95</sup>

!CALL FOR PRICES ON ALL OKIDATA PRINTERS!

### Star Micronics

Gemini 10 & 15..... Price is Too Low To Publish

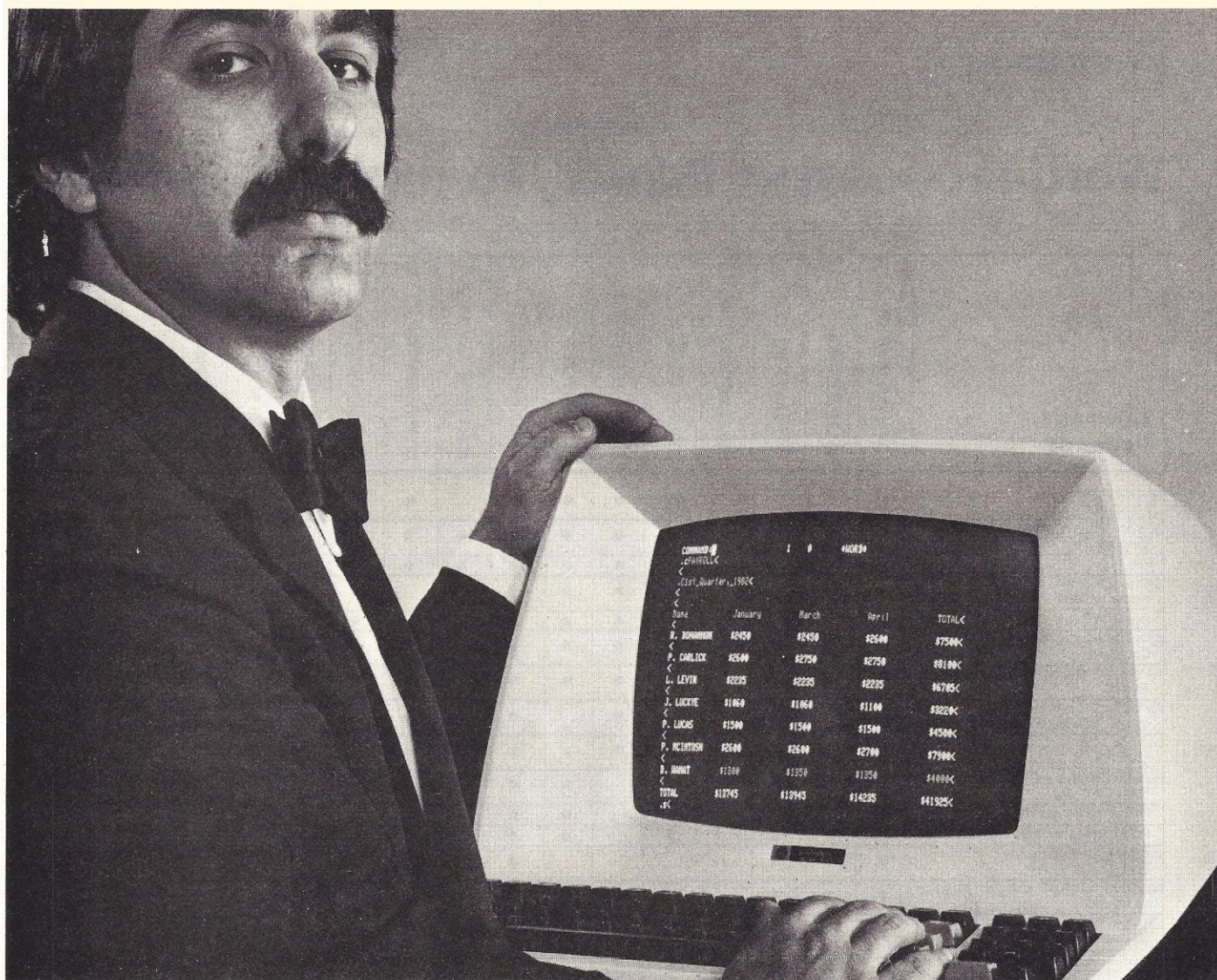
### IDS Prism

132 Color..... \$149<sup>95</sup>

### Smith Corona

TP-I Parallel or Serial..... \$56<sup>95</sup>

Call for prices on Epson's New FX Series



# #1 with Words. A+ with Numbers.

## Spellbinder Word Processing and Office Management Software.

### Spellbinder processes words *and* numbers.

So you save time and improve accuracy in any document: Financial statements. Budgets. Reports. Invoices.

Spellbinder lines up columns of numbers for faster data entry; calculates rows and columns; and puts the totals where you want them.

Spellbinder performs a number of mathematical functions, such as addition, subtraction, and multiplication; extends figures (for example, *6 dictionaries @ \$12.35 = \$74.10*); adds tax to invoices; and displays convenient reference tables.

You can edit numbers within a column, or move a column to a different location. Spellbinder's integrated forms handler saves time and manpower on multiple invoices, reports, and other documents.

### The software for discriminating users.

Whether you process numbers or words, you'll appreciate Spellbinder's unrivalled ease-of-use and superior capabilities. Spellbinder and an inexpensive microcomputer easily outperform *dedicated* word processing systems costing *up to three times* more.

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Spellbinder features flexible printing options; mass mailing and legal text capabilities; plus forms handler and boiler plate features for commonly used documents.

Spellbinder makes word processing much easier, much faster, and much less expensive. In fact, many of our users convert from some of the better known (and more costly) systems.

You should be just as discriminating. See your nearest dealer for a demonstration of Spellbinder. Or call Lexisoft at (916) 758-3630.

Now available in 8086 and IBM® Personal Computer format.

**Spellbinder**<sup>TM</sup>  
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(continued)

# Word-Processing Printer/Formatting Features

COMPANY/ PACKAGE	CONTINUOUS FORMS	MULTIPLE COPIES	ANY PAGE FROM A FILE	SIMULTANEOUS I/O SPOOL	CHANGE VERTICAL PITCH	SPECIAL CHARACTERS	CHANGE FONTS	LINE/FORM FEED	PRINT FROM ANY PAGE	STOP PAGINATION	PAUSE CHARACTER	UNFORMATTED PRINTING	MICRO SPACE SHIFTS	PROPORTIONAL SPACING	JUSTIFICATION Right	Left	Center
AB COMPUTERS Papermate	•	•	•		•	•	•	•		•	•				•	•	•
ADVANCED OPERATING SYSTEMS Clean Slate	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Pen Pal	•					•	•	•	•	•	•	•		•	•	•	•
APPLE COMPUTER INC. Apple Writer II	•				•	•	•	•			•	•			•	•	•
Apple Writer III	•				•	•	•	•			•	•			•	•	•
APPLIED MICROCOMPUTER SYSTEMS Documate	•	•			•	•	•	•		•	•	•		•	•	•	
APPLIED RESEARCH & CONSULTING Text85	•	•	•		•	•	•	•	•	•	•	•			•	•	•
ARTSCI INC. Magic Window II	•	•	•		•	•		•	•	•				•	•	•	•
BATTERIES INCLUDED PaperClip	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BEAMAN PORTER INC. PowerText-IBM	•	•	•		•		•	•	•			•			•	•	•
PowerText-Pascal	•	•	•		•		•	•	•			•			•	•	•
PowerText-Run-Time	•	•	•		•		•	•	•			•			•	•	•
BRODERBUND SOFTWARE Bank Street Writer	•	•	•					•	•	•		•				•	•
BRUCE & JAMES PROGRAM PUBLISHERS Wordvision	•	•	•			•	•	•	•	•	•	•			•		•
CHARLES MANN & ASSOCIATES Docuwriter	•	•	•		•	•	•	•	•	•		•		•	•	•	•
Master Text Processor	•	•	•		•	•	•	•	•	•		•		•	•	•	•
Personal Text Processor	•	•	•		•	•	•	•	•			•			•	•	•
COMMODORE BUSINESS MACHINES Easyscript	•	•	•		•	•		•	•	•	•	•		•	•	•	
COMPUTER MARKETING SERVICES Wordcraft Ultra	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
COMPUVIEW PRODUCTS VEDIT															•		
CORVUS SYSTEMS INC. EdWord	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CROMEMCO INC. WriteMaster	•		•	•	•	•		•	•			•		•	•	•	•
DATAMOST Write-On-Apple	•	•	•			•		•	•	•	•	•			•	•	•
Write-On-IBM	•	•	•			•		•	•	•	•	•			•	•	•
DESIGNER SOFTWARE Palantir	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•
HAYDEN SOFTWARE COMPANY P.I.E. Writer-Apple	•	•				•	•	•	•	•	•	•			•	•	•
P.I.E. Writer-IBM	•	•	•			•	•	•	•	•	•	•			•	•	•
HEWLETT-PACKARD Word 100	•	•			•	•	•	•		•	•	•		•	•	•	
WordStar 100	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	
HUMAN ENGINEERED SOFTWARE HES Writer	•	•										•				•	•
IBM Easy Writer II	•	•			•	•	•	•		•	•				•	•	
I.J.G. Electric Pencil	•	•	•		•	•	•	•	•	•		•		•	•	•	•
INFORMATION UNLIMITED SOFTWARE Easy Writer II	•	•	•	•	•	•	•	•	•	•			•	•	•		
KENSINGTON MICROWARE LTD. Format II	•	•	•		•	•	•	•	•	•	•		•	•	•	•	
LEXISOFT Spellbinder	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•
LIFETREE SOFTWARE INC. Volkswriter	•	•	•				•	•	•	•	•	•	•	•	•	•	
LJK ENTERPRISES INC. Letter Perfect	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•

[illegible]

(continued on page 128)

# "I built this 16-bit computer and saved money. Learned a lot, too."

**Save now by building the Heathkit H-100 yourself. Save later because your computer investment won't become obsolete for many years to come.**

Save by building it yourself. You can save hundreds of dollars over assembled prices when you choose the new H-100 16-Bit/8-Bit Computer Kit – money you can use to buy the peripherals and software of your choice.

## **H-100 SERIES COMPUTER SPECIFICATIONS:**

**USER MEMORY:**  
128K-768K bytes\*

**MICROPROCESSORS:**  
16-bit: 8088  
8-bit: 8085

**DISK STORAGE:**  
Built-in standard  
5.25" disk drive,  
320K bytes/disk

**KEYBOARD:**  
Typewriter-style,  
108 keys, 13  
function keys,  
18-key numeric pad

**GRAPHICS:**  
Always in graphics mode.  
640h/225v resolution;  
up to eight colors  
are available\*\*

**COMMUNICATIONS:**  
Two RS-232C Serial  
Interface Ports and  
one parallel port

**DIAGNOSTICS:**  
Memory self-test  
on power-up

**AVAILABLE SOFTWARE:**  
Z-DOS (MS-DOS)  
CP/M-85  
Z-BASIC Language  
Microsoft BASIC  
Multiplan  
SuperCalc  
WordStar  
MailMerge  
Data Base  
Manager  
Most standard  
8-bit CP/M  
Software

128K bytes standard. \* Optional.

The H-100 is easy to build – the step-by-step Heathkit manual shows you how. And every step of the way, you have our pledge – "We won't let you fail." Help is as close as your phone, or the nearest Heathkit Electronic Center.

And what better way to learn state-of-the-art computing techniques than to build the world's only 16-bit/8-bit computer kit? To run today's higher-speed, higher-performance 16-bit software, you need an H-100. It makes a significant difference by processing more information at faster speeds.

Dual microprocessors for power and compatibility. The H-100 handles both high-performance 16-bit software and most current Heath/Zenith 8-bit software.

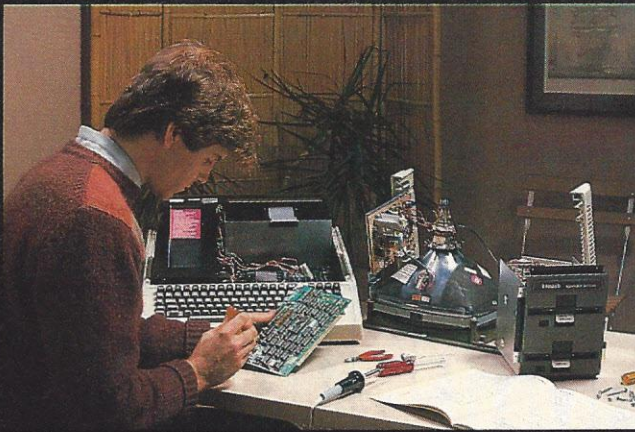
Want room to grow? The H-100's standard 128K byte Random Access Memory complement can be expanded to 768K bytes – compared to a 64K standard for many desktop computers.

And the industry-standard S-100 card slots support memory expansion and additional peripheral devices, increasing future upgradability of the H-100.

High-capacity disk storage, too. The H-100's 5.25" floppy disk drive can store 320K bytes on a single disk. The computer also supports an optional second 5.25" and external 8" floppy disk drives. And an optional multi-megabyte internal Winchester disk drive will be available in the near future.

***The H-100 gives me the most for my computer dollar!***





Critical circuits are pre-assembled, making the H-100 easier and faster to build!

Want beautiful high-resolution graphics? You can create extensive charts, drawings, graphs and symbols to meet your needs — using the H-100's bit-mapped graphics and its 640 x 225 pixel video display.

The H-100 gives you total communications flexibility. Three interface ports let you plug in dot-matrix and letter-quality printers, as well as other peripherals.

**Compare the H-100's exceptional capabilities with other desktop computers:**

COMPUTER:	Heathkit H-100	IBM Personal Computer	Apple III
<b>MICROPROCESSORS:</b>			
16-bit:	8088	8088	—
8-bit:	8085	—	6502
<b>RANDOM ACCESS MEMORY:</b>			
Minimum:	128KB	16KB	128KB
Maximum:	768KB	576KB	256KB
<b>FLOPPY DISK STORAGE:</b>			
Per Diskette:	320KB	320KB	140KB
Maximum Internal:	640KB	640KB	140KB
8" Floppy Support:	Standard	—	—
<b>EXPANSION SLOTS:</b>	Five S-100 (four available)	Five (three available)	Eight
<b>I/O PORTS:</b>			
Parallel:	1	Optional	—
Serial:	2	Optional	1
<b>VIDEO DISPLAY:</b>			
Line Columns	25 x 80	25 x 80	24 x 80
Pixels Colors	640 x 225 (8 colors)	640 x 200 (2 colors) 320 x 200 (4 colors)	560 x 192 (16 colors)
<b>OPERATING SYSTEMS:</b>	CP M-85, Z-DOS (MS-DOS)	CP M-86, PC-DOS (MS-DOS) UCSD P-System	Apple SOS

Information current as of 8/31/82. \* \* \* External disk storage available soon.

Learn by building. When you build and operate the H-100, you learn more about this sophisticated computer system and its unique 16-bit/8-bit software capabilities.

Learn from outstanding documentation. One of the most important parts of any computer system is documentation — and Heathkit documentation is among the industry's best. Our instruction and operating manuals are fully detailed, in the world-famous Heathkit tradition.

Learn by doing. Many of our software programs come with a complete set-up and operating manual. More complete than most other software documentation, each manual not only tells you what the program will do — it shows you the easiest way to accomplish each task.

We back you all the way. With Heathkit computer products, technical assistance and expertise is as close as your telephone — or the nearest Heathkit Electronic Center.† Complete technical assistance and service is available at over 60 locations nationwide.

Buy from a leader. When you choose a Heathkit computer, you get the backing and reliability of the world's leader in quality electronic kits for over 50 years! You can count on us for quality, service, reliability and value — at kit prices that give you more computer for your dollar!

See the H-100 in action. Visit your nearby Heathkit Electronic Center, which has the world's first 16-bit/8-bit computer kit, peripherals and software programs on display. See your telephone white pages for the nearest store location. Or mail the coupon today for a FREE, full-color Heathkit computer catalog.



Always in graphics mode, you can control each of the H-100's 144,000 screen dots! (Color graphics optional)

**CLIP COUPON AND MAIL TODAY TO:**

**Heath Company, Dept. 342-014  
Benton Harbor, MI 49022**

Please send my FREE Computer Catalog, with details on the new 16-bit/8-bit H-100 Computer Kit, today!

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

CP-218 Zip \_\_\_\_\_

† Heathkit Electronic Centers are units of Veritechnology Electronics Corporation. Heath Company and Veritechnology Electronics Corporation are subsidiaries of Zenith Radio Corporation. Prices, product availability and specifications are subject to change without notice.

# SPECIAL REPORT

(continued from page 125)

## WORD-PROCESSING PRINTER/FORMATTING FEATURES

COMPANY/ PACKAGE	CONTINUOUS FORMS	MULTIPLE COPIES	ANY PAGE FROM A FILE	SIMULTANEOUS I/O SPOOL	CHANGE VERTICAL PITCH	SPECIAL CHARACTERS	CHANGE FONTS	LINE/FORM FEED	PRINT FROM ANY PAGE	STOP PAGINATION	PAUSE CHARACTER	UNFORMATTED PRINTING	MICRO SPACE SHIFTS	PROPORTIONAL SPACING	JUSTIFICATION Right	Left	Center
MARK OF THE UNICORN The Final Word	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
METASOFT CORPORATION The BENCHMARK	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MICROPRO INTERNATIONAL WordStar	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MILLER MICROCOMPUTER SERVICES FORTHWRITE	•	•	•	IBM	•	•	•	•	•	•	•	•	•	•	•	•	•
MUSE SOFTWARE Super-Text Professional	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Super-Text Home/Office	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NEC HOME ELECTRONICS NEC Word Processing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Phantom Pen	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NEMCO Word Flex	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NORELL DATA SYSTEMS CORP. Easyword Processing System (incl. Easyedit, Easytext, Easyproof)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NORTH STAR COMPUTERS NorthWord	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NorthWord II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PEACHTREE SOFTWARE PeachText	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PERFECT SOFTWARE Perfect Writer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROFESSIONAL SOFTWARE INC. WordPlus-PC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WordPro 4 Plus	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WordPro 3 Plus/64	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROSOFT NEWSCRIPIT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
QUARK Word Juggler	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
QUICK BROWN FOX INC. Quick Brown Fox	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RACET COMPUTERS Electric Pencil	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RADIO SHACK SuperSCRIPSIT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCRIPSIT 2.0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCRIPSIT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SATELLITE SOFTWARE INT'L. Word Perfect	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SELECT INFORMATION SYSTEMS Select	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SIERRA ON-LINE INC. Screenwriter II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOF/SYS INC. The Executive Secretary	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Executive Secretary Plus	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOFTWARE PUBLISHING CORP. PFS:WORD	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOFTWARE TOOLWORKS TEXT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SORCIM CORPORATION SuperWriter	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STRUCTURED SYSTEMS GROUP Word Right	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TEXAS INSTRUMENTS INC. TI Writer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
THRESHOLD SOFTWARE INC. Write/Idea	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VECTOR GRAPHIC INC. Memorite II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VISICORP VisiWord	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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(continued on page 171)

# Compute While You the Buffer that

Your computer is a real whiz when it comes to time. Like you, it works fast. But most printers don't. Most printers are *slow*. If you ever have to wait for your printer you are wasting time. Valuable time.

But with Microfazer, there's no more waiting.

Microfazer is the print buffer that frees your computer. That lets it work fast. That helps you work faster, too.



any data processing environment, it's truly the "any computer any printer" buffer. With models for any data transmission need. Serial or parallel. Or to interface in-compatible devices. And

there's always the traditional Quadram Quality.

The assurance you are getting the finest buffer available.

## MICROFAZER REMEMBERS IT ALL

Microfazer stores data from your computer in its own memory, then sends it to the printer at a rate the printer can handle. And Microfazer can be expanded at any time to meet all your future requirements.

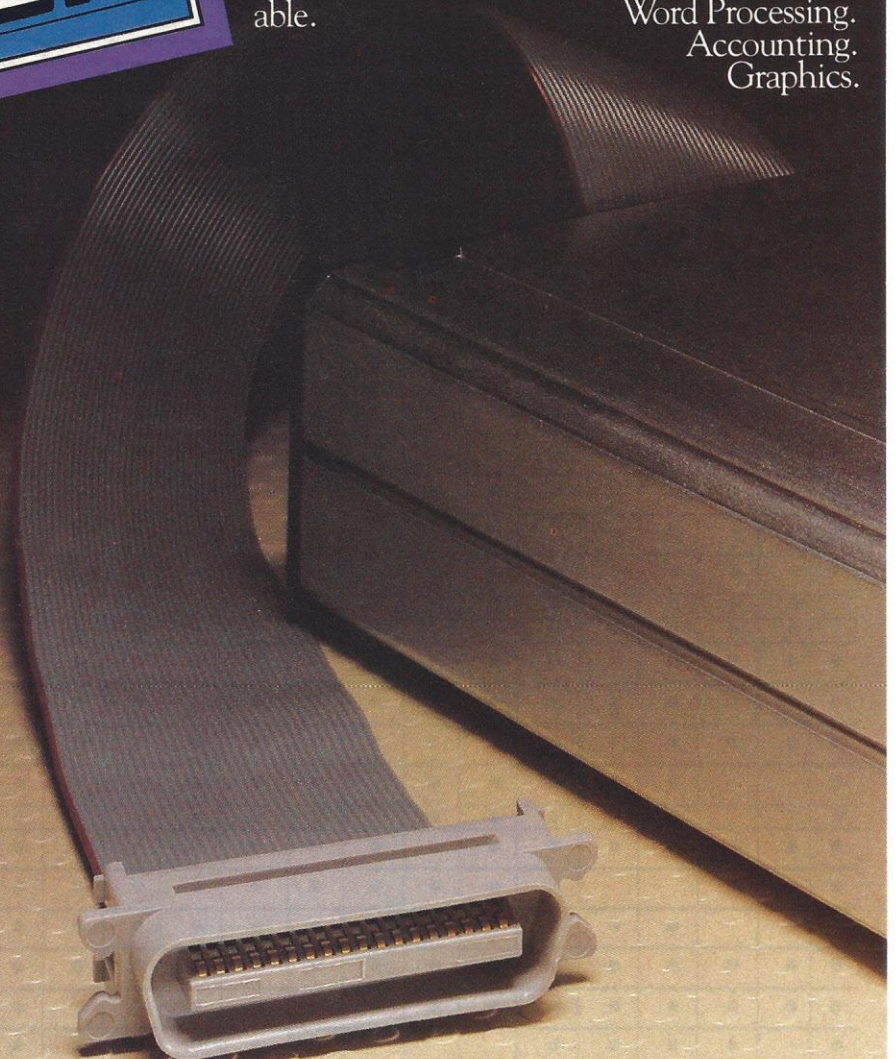
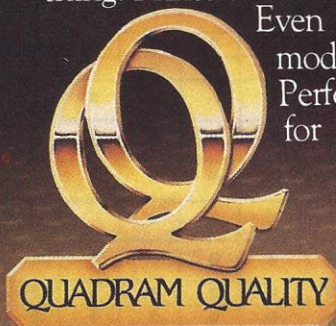
The print buffer that offers 512K of memory—a full half-megabyte—Microfazer can handle *any* buffer task.

Word Processing.  
Accounting.  
Graphics.

## THE "ANY COMPUTER ANY PRINTER" BUFFER

Microfazer goes with anything. Printers. Plotters.

Even  
modems.  
Perfect  
for



Available at retail stores worldwide.

# Print with Microfazer,<sup>™</sup> Remembers It All.

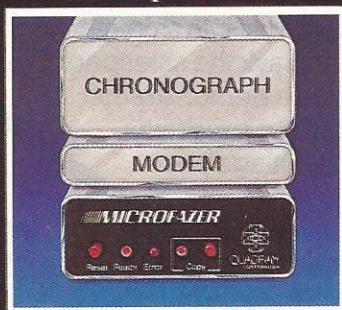
You name it.

So stop worrying about losing vital data because you run out of buffer space. Whatever the job—no matter *what* the size—Microfazer remembers it all.

## BUT MICROFAZER REMEMBERS MORE...

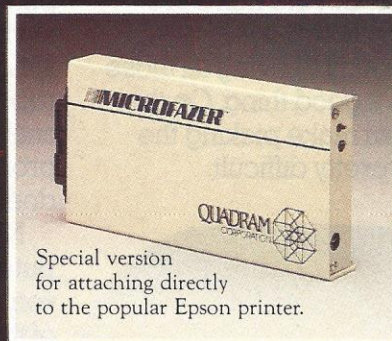
Microfazer remembers to give you the hardware features you're looking for in a print buffer. Features that include a Ready LED, manual Reset and Pause/Copy buttons. And Microfazer comes in a variety of convenient sizes. To

stand alone or stack with other peripherals. To snap onto the back of the popular Epson printer. There's even a model that plugs *inside* an Epson!



## AND PRICED RIGHT, TOO

And with Microfazer you don't have to wait because of price. Parallel to parallel versions start at \$159 (8K), serial to parallel and parallel



Special version for attaching directly to the popular Epson printer.

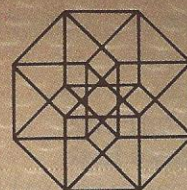
to serial versions start at \$199 (8K with cable), and serial to serial versions start at \$229 (8K with power supply).

Available in models from 8K to 512K.

So stop waiting on your printer. Compute while you print with Microfazer. You'll never have to wait again.



MICROFAZER.  
THE PRINT BUFFER.  
THAT REMEMBERS IT ALL.



**QUADRAM**  
CORPORATION  
A Division of Intelligent Systems.

# IF YOU'RE CONFUSED PERSONAL COMPUTER,

At this moment, there are no less than 50 personal computers on the market. And more are being introduced every day.

On one hand, having all those options is a good thing. On the other, it can make picking the right one pretty difficult.



*Computers come in two parts.  
You have to buy both.*

We'd like to help. So here are a few suggestions about how to buy the computer that's right for you.

## **Computers come in two parts.**

One part is the "hardware," which is the machinery itself. The other is the "software," or a program, as it's sometimes called.

Software is the part that tells the computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything.

And vice versa.

You have to buy both.

## **Buy the software first.**

Since the reason you're buying a computer is to get the capability the software gives you (remember, it's the software that knows how to get things done), it makes good sense to pick the software first.

Start by making a list of the things you want to use the computer for. It can include almost anything—any kind of inventory, filing, accounting, graphics, reporting, record-keeping, analysis—you name it and there's probably a software program that does it.

Next, take the list into a computer store and ask the salesperson to give you a demonstration of the program, or programs, that will do the things you want.

Even though you'll need a computer for the software demonstration,

keep in mind the computer is just a vehicle. The software is the driver. And once you've decided on the software, picking out the rest of the computer system will be much easier.

## **The simpler the better.**

Look for software that's easy to learn, easy to use, and that does the job in the simplest way possible.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you have to do without getting in the way.



Meaning there are no complicated routines to follow to perform a simple task. And no programming language to learn.

Some people, however, will tell you that software has to be complicated to be powerful.

Nothing could be farther from the truth.

Because in order for a program to appear simple to you on the outside, it has to be extremely complex on the inside.

# ABOUT BUYING A HERE'S SOME HELP

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

## **You simply have to see for yourself.**

You can read any number of interesting books and magazines about personal computers. You can ask friends who have them. You can look at all the sales literature you can get your hands on. And you should do all those things before you decide to buy.

But as helpful as all that can be, there really is no substitute for a real, live demonstration.

When you do go out shopping, we recommend you take a look at the PFS® Family of Software.

The PFS family is designed the way we think all software should be: simple, straightforward and powerful.

Currently, three products make up the family. PFS:FILE, PFS:REPORT and PFS:GRAPH, with more programs on the way. Here's a little more about each of them.

## **PFS:FILE. The simplest way to get organized.**

Basically, FILE works like a paper filing system, without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

FILE lets you arrange your information in "forms" you design yourself. So you can get at and really use your information in ways never before possible.

What's more, FILE lets you change the original form without having to redo the information on it.

## **PFS:REPORT. Making the most of your information.**

REPORT summarizes the information on your forms so you can use it to analyze, plan and make better-informed decisions.

With REPORT, you get presentation-quality reports—sorted, calculated, formatted and printed—automatically, in seconds.

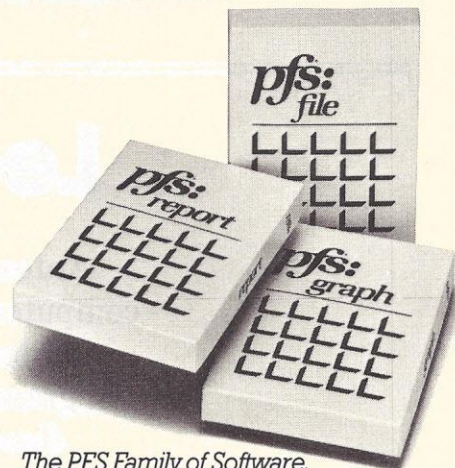
## **PFS:GRAPH. Instant pictures.**

GRAPH gives you presentation quality bar charts, line graphs, and pie charts, in black and white or color, on paper or the computer screen. To get a clearer picture of things and spot trends instantly, you simply enter your information and specify the kind of graph or chart you want. GRAPH does the rest.

You can also mix and match line and bar graphs, or even stack or compare up to four bar graphs simultaneously.

And GRAPH will work with PFS:FILE, VisiCalc® files, or data entered directly into the computer.

Best of all, compared to the cost of hand-drawn graphics, GRAPH can save you enough money over the course of a few months to pay for the computer it runs on.



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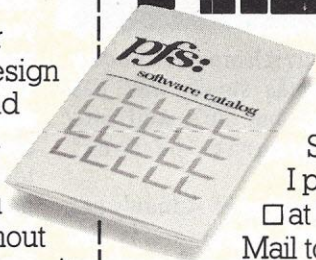
It's free. And all you have to do to get one is return the coupon below, or see your participating PFS dealer.

The PFS Family of Software. We've already made computers simpler to use.

Now we're making them simpler to buy.

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PER 4/83

# Learning To Win

Antonia Stone is helping to install personal computers in prisons, halfway houses, and ghetto community centers. Through game-format programs, the computer advantage is giving the disadvantaged job skills and self-esteem

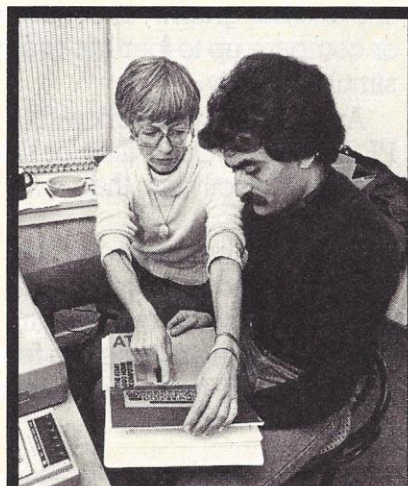
by Trudy E. Bell, Associate Editor

**A**dnan sits at the Commodore PET personal computer in the disheveled computer room of the Fortune Society, patiently running and revising a simple program to position a dot anywhere on the video screen. "This number called POKE tells me where the dot is on the screen. By changing the POKE number I can move the dot anywhere," he explains in his slow, somewhat slurred speech. After a few minutes' experimentation, he centers the dot and then makes it blink off and on, alternating with a dash so that it looks like a little mouth opening and closing. Adnan leans back and looks up with an impish grin.

Two years ago Adnan, then 19, was declared retarded by his teachers and parents. He could neither read nor write. He couldn't count, add, or subtract. His tongue lolled; he stuttered badly. He had been arrested numerous times in New York for petty offenses. At that time he was referred to the Fortune Society, a non-residential counseling center in New York City serving ex-offenders and young people in trouble with the law.

Luckily for Adnan, the Fortune Society had just received several personal computers as part of an educational pilot project. When other kids began playing non-verbal computer games such as Othello and backgammon, Adnan stood and

watched...and watched. Then he began to play the games, getting better each time. "I began to wonder what makes the games tick," he remembers. Burning with a new curiosity, he doggedly began to learn to



Antonia Stone and an assistant review programming for an Atari 800.

photos by Andy Levin/Black Star

read and do arithmetic. Today Adnan still speaks slowly and has trouble spelling, but he's well into learning to program personal computers.

The transformation of Adnan's life through personal computers is not unique. In fact, such transformations are the business of Playing to Win, Inc., a non-profit agency that helps install personal computers in prisons,

halfway houses, and ghetto community centers.

Playing to Win is described in its brochure as "the only non-profit organization in the entire country which is dedicated to promoting computer use for education of minorities, inmates of correctional institutions, juvenile delinquents, and other socially handicapped people."

The founder of the agency is Antonia Stone, a tall, athletic woman in her early 50s with a shag haircut, alert blue eyes, and a purposeful manner. "Playing to Win is devoted to preventing computer use from putting up another barrier between the advantaged and the disadvantaged," she explains. "We do this by using computers to help the socially handicapped learn the three Rs, and by giving them a chance to learn computer skills that will equip them to find jobs."

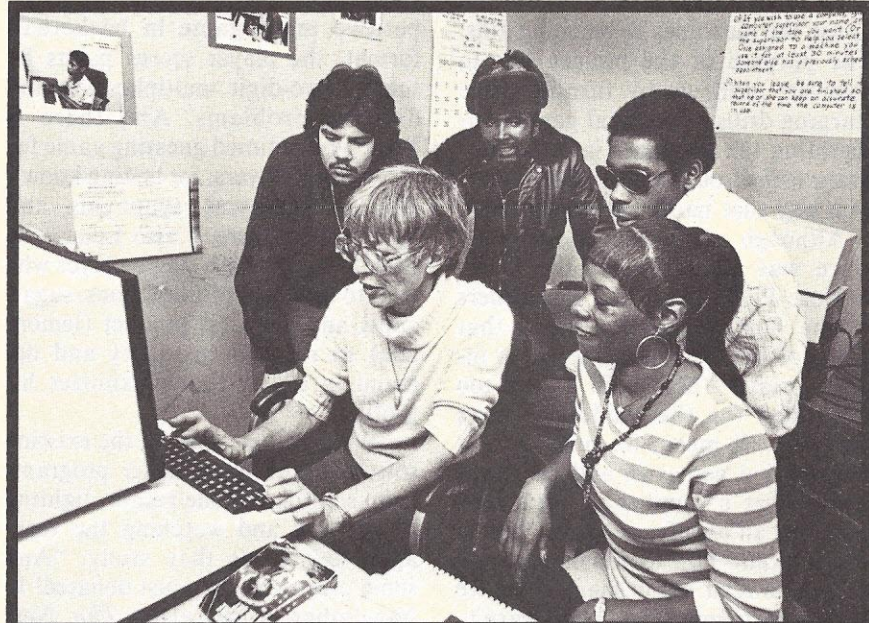
Stone has a long background in education and in computers. For 25 years she was a teacher in the public and private school systems of New York and New Jersey. For the last eight of those years, she was intensely involved with computers as learning tools. She taught courses in computing literacy, computer use, and BASIC programming. "In one of my New Jersey township schools, the majority of my students were children of itinerant farm workers," she recalls. "They didn't want to be in

school, and their families would have preferred to have them at home doing chores. The challenge of that teaching—and the enormous rewards of being able to connect with the students and see them discover that learning is fun—stayed with me. And much later, in private schools, I discovered how games and computers can motivate learning—that often if you offer a game or game-like program on a computer, it is an effective way of getting people involved.”

Watching kids spend hours playing arcade video games, Stone began to wonder whether computers might also be a way of motivating culturally disadvantaged students—minorities who had never been given a real chance, or especially those society forgets: prisoners. In late 1979, while chairwoman of the mathematics department of Columbia Grammar and Preparatory School, Stone began doing background research on prisons and their educational programs. She became convinced that personal computers could benefit prisoners by giving them motivation to learn career skills, which would give them a sense of competence—and maybe a reason to want to go straight. It was then that she began to develop *Playing to Win*.

In March 1980 Stone approached the Fortune Society to enlist its help in installing computers in prisons. “I figured that if I were to have any chance of success inside a prison, I’d need help from someone who’d had some experience—and who better than an ex-con?”

At the time that Stone approached the Fortune Society, it was offering tutorials ranging from basic reading and math to high-school equivalency. Through these programs some clients could make the transition back into society through a 10-month work-study program—taking tutorials full-time, two or three days each week, and working at jobs the remaining days each week. The Fortune Society also offered guidance on looking for



In the computer room of the Fortune Society, Stone shows a class of students how to operate a Commodore PET. On the walls are rules for using the computer center.

permanent jobs and going through interviews—all with the aim of helping its clients gain skills and self-esteem, and secure satisfying, productive employment.

At the Fortune Society Stone met with education director Lynne Ornstein, who was skeptical of the *Playing to Win* proposal. “It’s my belief that part of the problem with prisoners and ex-cons is that they are starved for attention, and what they respond to most is the one-to-one attention of tutoring. I didn’t see how computers could help that.” But Stone was insistent. She suggested a pilot project at the Fortune Society itself to demonstrate the concept—she’d get the money for the hardware and would volunteer her labor for the software, just to see whether it would fly. Ornstein had to admit the deal sounded irresistible. “What did we have to lose?”

Having secured Ornstein’s approval of the project, Stone went to work. By May 1980 she’d convinced friends and associates to donate enough money to buy three 8k Com-

modore PETs for the Fortune Society. “Of all the machines examined, the Commodore PET seemed to offer the greatest advantages,” Stone recalls. “The PET has a separate keypad for numbers, unlike the teletype keyboard for the Apple. Also, the machine comes in one unit, which improves the security. And a lot of educational software existed for it at the time. Also, Commodore gave us the best price of all the companies.”

The machines were placed in the lounge and study areas that primarily serve the juvenile division—kids from 16 to 21. Since then two other machines have been added, along with a Commodore CBM word processor and an Epson printer. All the equipment has been moved to a larger room, now dubbed the “computer room.” The walls are scuffed, the linoleum floor cracked and sprinkled with cigarette ash, but the only soil on the computers is from love and use.

After the personal computers were installed, Stone helped train the staff and volunteers at the Fortune Society

to use the machines as teaching aids. The purpose of the project was to motivate students by turning basic learning drills into actual games. Integrating the machines into the program turned out to be a challenge—in a way that had a surprising twist.

Although much educational software was available for the Commodore PET, Stone and the leaders at the Fortune Society found that many of the existing games were inappropriate. "Much of it was too advanced for the students," says Ornstein. "I mean, in some cases a teenage kid comes in and he might know what a number is. He's seen numbers all his life, of course, but he doesn't know how to add or subtract, or how to read. So in many cases we had to start from scratch and learn to devise our own programs."

One program, for adults just learning to read, is a game called Making Cents. In the middle of the video screen there appear the first two letters of a three-letter word, followed by a blank: for example, LI—. Across the top of the screen are eight or 10 letters of the alphabet, along with the Scrabble value of each letter, for example:

D	X	P	L	J	A	T	E
2	8	3	1	8	1	1	1

Each time the player selects a letter that will complete an actual word, that Scrabble value in cents is added to the pot of "money" being earned in each game. For example, in this round a player could earn a total of seven cents (for LID, LIP, LIT, LIE).

Another game at a similar level, for adults learning basic arithmetic, is the familiar format of Beat the Clock. Addition or subtraction problems are flashed onto the screen, and the aim is to enter the correct answer and solve as many problems as possible in two minutes, while the computer keeps score.

Not all the games teach such rudimentary skills. For more advanced students there is Slam Dunk, a com-

petitive math game in basketball format; the player scores points by solving two-digit multiplication and division problems. And there is Wordwise, a timed guessing game for one to four players, for testing knowledge of antonyms, synonyms, and homonyms. There is also Lemonade Stand, a game for a single player who tries to order supplies (lemons, sugar, cups) and price his product (lemonade) to respond to supply and demand in a way that maximizes his profit.

"We modified some of the existing software, and wrote other programs from scratch," Stone recalls, lighting a cigarette and watching the teenagers banter as they study. "And some programs were just donated! In November 1980, after *The New York Times* ran an article on the Fortune Society and what we were trying to do, a remarkable number of people just sent in programs and even floppy disks, writing 'Here's something I hope you can use—and good luck!' Now we realize donations can be an important source of educational programs for this kind of work."

The Fortune Society now has about 300 games and their variants, in the three basic categories of English, mathematics, and logic, at all levels from the three Rs to high school and beyond.

"We found it's very important to have editable programs," Ornstein observes. "For example, in Wordwise there are probably only 30 problems with their answers. But at any time, we can ask the computer to list the program," she says, typing a few keys until the video screen is filled with scrolling text, "and we can change the problems and answers whenever we wish. That means the same format is always useful and you never grow out of a game."

"Also, for the most basic levels of teaching we don't want any negative reinforcement. It's frustrating enough for these kids to learn without being made to feel stupid if they can't

get something right the first time—or the fifth time. So although our games give rewards for right answers by flashing the word CORRECT! or filling in a tic-tac-toe board, they don't give penalties for wrong answers—they just repeat the problem until the player gets it right. At higher levels of expertise, however, the kids can elect whether or not they want the challenge of a penalty for wrong answers."

### *The payoff*

It's still too early to measure the full effect of Playing to Win's program on the Fortune Society students, but some individual facts are undeniable:

- Adnan saved enough money from his earnings from his part-time job as the janitor of the Fortune Society to buy a small Commodore VIC-20 for himself. Reading and arithmetic are still laborious for him, but he is driven by his desire to learn more about how to work the machine. And he knows that in order to become expert, he must know how to read the documentation and do calculations. "We wouldn't have been able to spend as much time with him as he's had on the computers to learn and drill," admits Ornstein. "He knows how to program better now than anyone else here at the Fortune Society." She sniffs: "Retarded, my a—!" Access to the personal computer has given Adnan a strong motivation to learn and has allowed his real ability to emerge.

- Ron, a 17-year-old high-school dropout with a 1½-year-old son, has been enthralled by computers for as long as he can remember. But in his neighborhood school was more a question of surviving than learning. After some run-ins with the law, Ron was referred to the Fortune Society to find a job. When he walked into the Society last fall, seeing the personal computers rekindled his childhood dream. Now, through the Fortune Society's CETA program, he's working to complete his high-

## *Playing to Win, Inc. is devoted to preventing computers from being another barrier between the advantaged and the disadvantaged.*

school equivalency certificate and to learn word processing. He's also taking a night course in BASIC at a nearby business institute. "I'd like to take programming," he states with fixed intensity. "My long-term goal is to be a technician—perhaps programmer, but mostly technician. After here I plan to seek college. And what I really want to do is go on to the Air Force. Every chance I get I'm going for it. It's like a dream—something I saw a long time ago. And I know now I can make it." Access to computers has given Ron the opportunity to realize his vision.

• Cecilia, now married and the mother of a 4-year-old son, came to the Fortune Society as a teenage runaway who had graduated from Phoenix House, a drug rehabilitation center. Through the computer center she earned her high-school equivalency certificate. At the computer center she also learned word processing and office skills. She now works full-time for the Fortune Society as bookkeeper, secretary for the education department, and word-processing in-

structor. Access to personal computers has given her skills to find self-supporting and satisfying work.

• Leroy, 19, struggles with almost grim determination to master subtraction in Beat the Clock. He is repeatedly stumped by problems such as 16-9, and 12-8. But three weeks ago, he couldn't even count. "With the computer replacing flashcards, he can drill at his own rate," observes Leroy's math instructor, Marie DeFrancis, who is also Fortune Society's educational coordinator for CETA. "He and the others seem to find the computer much more appealing than flashcards or writing out the problems. Especially at this level, the computer eliminates the frustration of trying to write. They (students) get immediate feedback as to whether an answer is right or wrong. The program also paces them, thus giving some kind of external discipline, so they're less likely to wander off between problems. The form just seems less tedious to them. I think the visuals help a lot, and they enjoy the

challenge of the machine. I don't believe computers take the place of a teacher or a classroom—but I've never seen anything like the reinforcement in drills."

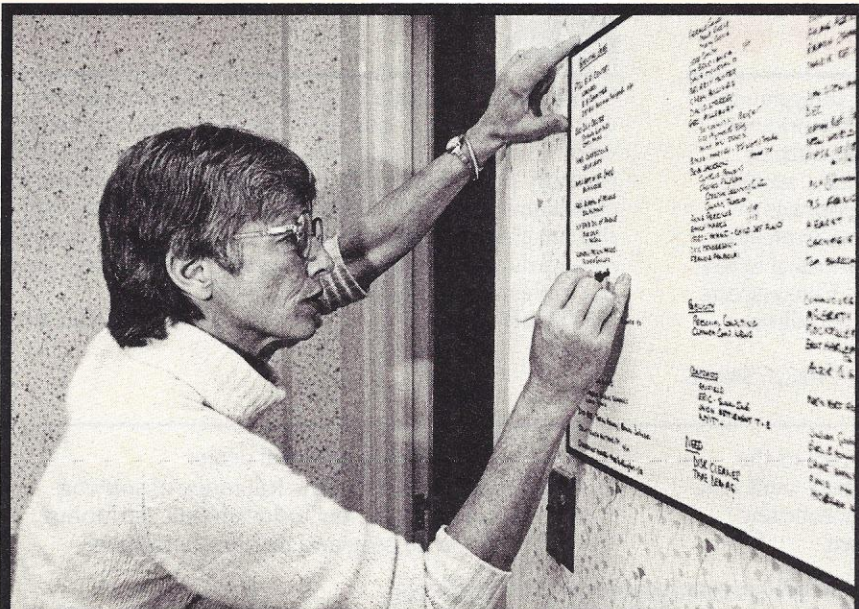
Demanding? Yes. With an intensity that is almost painful to watch, Leroy competes with himself to get more and more problems right. But when he topped 50 problems in two minutes, his weary smile hinted at a gain greater than the subtraction skill—another step in building up his self-esteem.

### *What next?*

If Antonia Stone and Playing to Win seem somewhat in the background of the Fortune Society, it's because Playing to Win's aim is to set up programs that will eventually become self-sustaining. Stone still drops in at the Fortune Society from time to time—primarily when she's needed to help solve a residual problem—or to say hello to a lot of people who became close friends over the course of the project. But Playing to Win's official role at the Fortune Society is largely over, and Stone is turning her energies to new projects.

One such project returns to her original aim in approaching the Fortune Society—installing computers at correctional institutions. The Spofford Juvenile Detention Center in the south Bronx is a secure facility for some 200 teenagers awaiting trial for serious crimes. In 1981 Playing to Win secured funding for a project which now involves 24 Commodore PET computers purchased by the City of New York for installation at Spofford. The computers are now in use 60 hours per week in both the learning center and the living quarters—and much of the educational program includes software Stone helped develop for the Fortune Society.

"People have a prejudice against convicts, as if they are a different species, or have some permanent disease such as leprosy that leaves them



Back in her offices, Stone updates a list of agencies which have expressed interest in Playing to Win, and consults the status of proposals and contributions.

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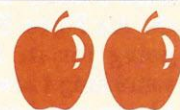


Sixty general purpose subroutines you can integrate into your BASIC programs, plus a step-by-step introduction to structured programming techniques. Subroutines include visual and sound effects, math utilities, sorting, input and output subroutines, and screen controls to enhance your programs. Use sounds such as explosion, siren, typewriter keystroke, splash, rattle, musical tones, and lots more (a must for the game writer). Video effects and screen controls include inverse banner headlines, bubble-up, pauses and more.

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*Stone has given prisoners a chance to use their incarceration time to learn useful skills and gain a better chance in the world upon their release.*

tainted for life," Stone declares frankly. "After convicts have served their sentences and are released, you can imagine how difficult it is for them to face that prejudice and to be accepted back into society—especially if they don't have skills to offer." Through Playing to Win, Stone's aim is to give prisoners a chance to use their incarceration time to learn useful skills that will give them a better chance in the world on their release.

In 1981 Stone also received an individual grant from the Ford Foundation to survey the computer situation at more than 30 correctional institutions around the country. She spent four months traveling and studying, looking at all types of prisons, from minimum to maximum-security, housing men, women, and juveniles. At these institutions she talked with administrators, instructors, and inmates. She saw that very few of the institutions had any kind of hands-on computer education for the inmates, though almost all of them wanted such computer programs.

Back in the Playing to Win office—which occupies one room of Stone's gracious apartment on New York City's upper east side—Stone met with two representatives of the Union Settlement Association to discuss Playing to Win's newest project for a very different cross section of the population. In late 1982 Playing to Win received partial funding to create and operate a computer center in the basement of the Washington Houses public housing project in east Harlem.

According to Gladys Patro-Soler, Director of the Washington Houses Community Center, all New York City public housing projects provide a community center for the neighborhood. The purpose of these centers is to offer vocational, educational, and recreational activities for the people of the community. Centers offer such services as classes on nutrition or arts and crafts, coun-

seling on family issues, day camps and recreation programs for children, and lunch programs for senior citizens. "The community centers are getting a lot of competition from video games, television, etc., and it's been difficult to attract kids in recent years," says Patro-Soler. "Kids are tuned in to machinery, equipment. Also, because of cutbacks in city funding, we've had trouble maintaining as many tutors as before, and continuing the learning programs. So the idea of a computer center came just in time."

The pilot grant, received at the end of 1982, will be used to install computer games parents can play with children, and also to offer life-skills programs such as instruction on first aid and nutrition. In addition to the partial funding, Warner Communications has donated an Atari 800 personal computer to get the project off the ground, and has promised 20 more when Playing to Win can complete the funding of the center.

Patro-Soler says plans for the center have generated a lot of excitement in the housing project. "Many adults in the housing project are unemployed," she says. "They feel if they learn the equipment, the software, and the basics of programming, it may be helpful to them in finding work. The kids are excited just by the idea of having computers around to play games with and do their lessons on."

Stone believes that within five years the community center leaders will have gained all the skills necessary to run the program themselves, and then Playing to Win will turn the project over to the neighborhood to run by itself.

There are a number of striking aspects about the life stories of the young people and adults of the Fortune Society and Spofford whose lives have been touched by Playing to Win. First is their sheer eagerness when faced with a personal computer. Their first reaction is fascination,

## RULES OF THE GAME(S)

**P**laying to Win has discovered some approaches to educational programs that are particularly effective in motivating students. From her experience Antonia Stone offers some standards to guide those who develop the organization's software—rules that may also benefit anyone creating educational programs for other purposes.

1. Entertainment is a primary goal. Each program should be played like a game with some game-oriented objective, such as scoring points for correct answers.
2. Each game must develop one or more basic math, verbal, or problem-solving skill.
3. Each game should offer various levels of difficulty and should allow competitive play—either for one person against the computer, or between two or more people playing against one another.
4. The game structure should include "help" or "hints" whenever appropriate.
5. Programs should be easy to alter for instructors wishing to custom-tailor them.
6. Graphics should be more dramatic for correct play than for incorrect play. Graphics should enhance the intrinsic game motivation. Displays should be attractive and innovative, but must not impede progress of play or waste time through unnecessary repetition.
7. Instructions should be minimal, and expressed clearly and simply.
8. No derogatory comments should be programmed into games. The impersonality and non-judgmental aspects of the computer should be emphasized.

Stone and the staff at the Fortune Society have discovered that the most versatile educational games are those in which new questions and answers can be inserted into the familiar structure as the student gains knowledge.

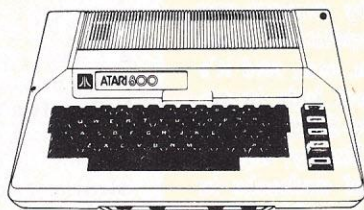
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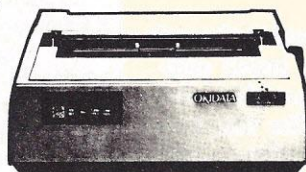


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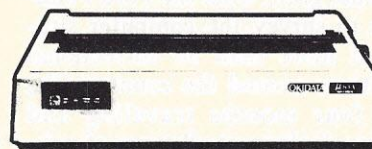
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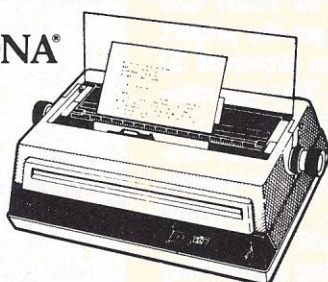
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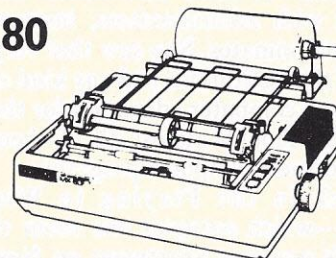
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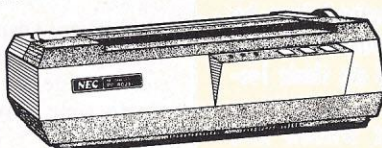
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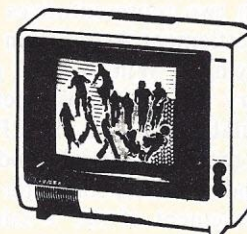
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***"You can't just drop computers into schools. You have to have someone who can see what's needed, set up the hardware, train the teachers."***

## EDUCATION

and their impulse is the desire to try, to learn, to improve themselves—not to destroy. In that respect the introduction of personal computers by *Playing to Win* breaks down some widely held stereotypes about cons and ex-cons.

Another astonishing aspect is that the kids who can't read, can't count, and can't write seem to have virtually no computerphobia. In spite of their illiteracy, they do not seem intimidated by the typewriter keyboard with its letters, numbers and symbols—even though they may find it frustrating to learn. "A few students react strongly against the computers—mainly the older students," Stone observes. "They walk into the room, take one look at the computers, and say 'This is not for me'—and walk right back out. To them the computers are a threat—but not because they're afraid to use the machines. Instead, the video screens are a personal threat to their egos. If they don't know multiplication, for example, all their weaknesses are displayed right there on a screen for anyone walking by to see. But this reaction is really the exception—perhaps only about one percent react negatively. One kid with cerebral palsy was so self-conscious of his slowness that he refused to try a computer until we moved one into a room where he could be by himself. And we had to modify some of the software because he wasn't able to respond to a timed format such as *Beat the Clock*. But after a while he gained enough confidence in his basic knowledge and self-esteem that he'd work in the same computer room as the others."

Why the lack of fear of computers? Speaking of Adnan, Ornstein observes: "Working the computer gives him a sense of accomplishment and power over at least one part of his environment."

Perhaps the transition to computers is easy for the disadvantaged because even people with low literacy

are already familiar with television and arcade video games. Perhaps it's because Stone has truly hit on the key to gaining knowledge through designing her educational exercises in a game format—to present students with new information in a way they associate with challenge and fun. Whatever the case, *Playing to Win* and the Fortune Society have learned a number of eye-opening lessons through introducing personal computers to the culturally disadvantaged.


First, the word-processing features of the personal computers encourage young people to express themselves. They don't have to struggle to form letters and characters on paper—something that may be particularly agonizing for a 19-year-old with mature thoughts and feelings. "Penmanship is part of our educational program, and eventually they do have to learn to write on paper," DeFrancis qualifies. "However, the word processor allows them to compose short stories, revise them, and print them out, without associating the frustration of the mechanics of writing on paper with the process of writing. They like the word processor—it is impressive to see what you've written come out all typed." However, as DeFrancis acknowledges, there is some question as to how you can grade a paper for form which was written on a word processor that checks for spelling errors.

Second, *Playing to Win* found that with some ingenuity it is possible to take advantage of some of the quirks of the culture often found in disadvantaged neighborhoods to motivate kids. For example, often the teenagers are competitive, sparring, macho. The Fortune Society found that macho competitiveness can actually be turned into motivation. "They'll never admit to it," DeFrancis murmurs in a low voice, out of earshot of the nearby students, "but it really bothers them to walk

around knowing that all their friends know something they don't. They're very conscious if their friend's doing division while they're still working on multiplication, and it spurs them to move on."

Third, in spite of that competitiveness, the personal computers can also encourage more cooperative social interaction within the computer center. Stone explains: "When reading literacy is very low, you have to explain verbally how to use the machine, not to rely on written instructions. When the kids need help, they then generally tend to ask another person in the room who may know the machine somewhat better." Through this daily interaction, they learn how to ask for help and how to give and receive help, without feeling that their pride is somehow at stake. Stone adds: "Also, even in a competitive game format they're concentrating on a non-judgmental machine, and the kids are able to cooperate in finding answers in a way we didn't see before."

Fourth, the agencies that have been helped by *Playing to Win* have discovered a fact that vindicates the modus operandi of *Playing to Win*: "You can't just drop computers into schools—any school," declares Ornstein. "You have to have someone like Antonia Stone who can see what things are needed, who can set up the equipment, who can train the other teachers and tutors to run the computers, and help the students, and change the programs as needed. Toni Stone gave us the core."

Responds Stone: "That initial TLC is what *Playing to Win* is all about." Perhaps most important of all to Stone, as she stands contemplating the rapt faces of the teenagers clustered around the PETs in the Fortune Society's computer center: "Personal computers have given many of these people a new lease on life—a feeling of hope and focus—a feeling that they belong in this technological age." 



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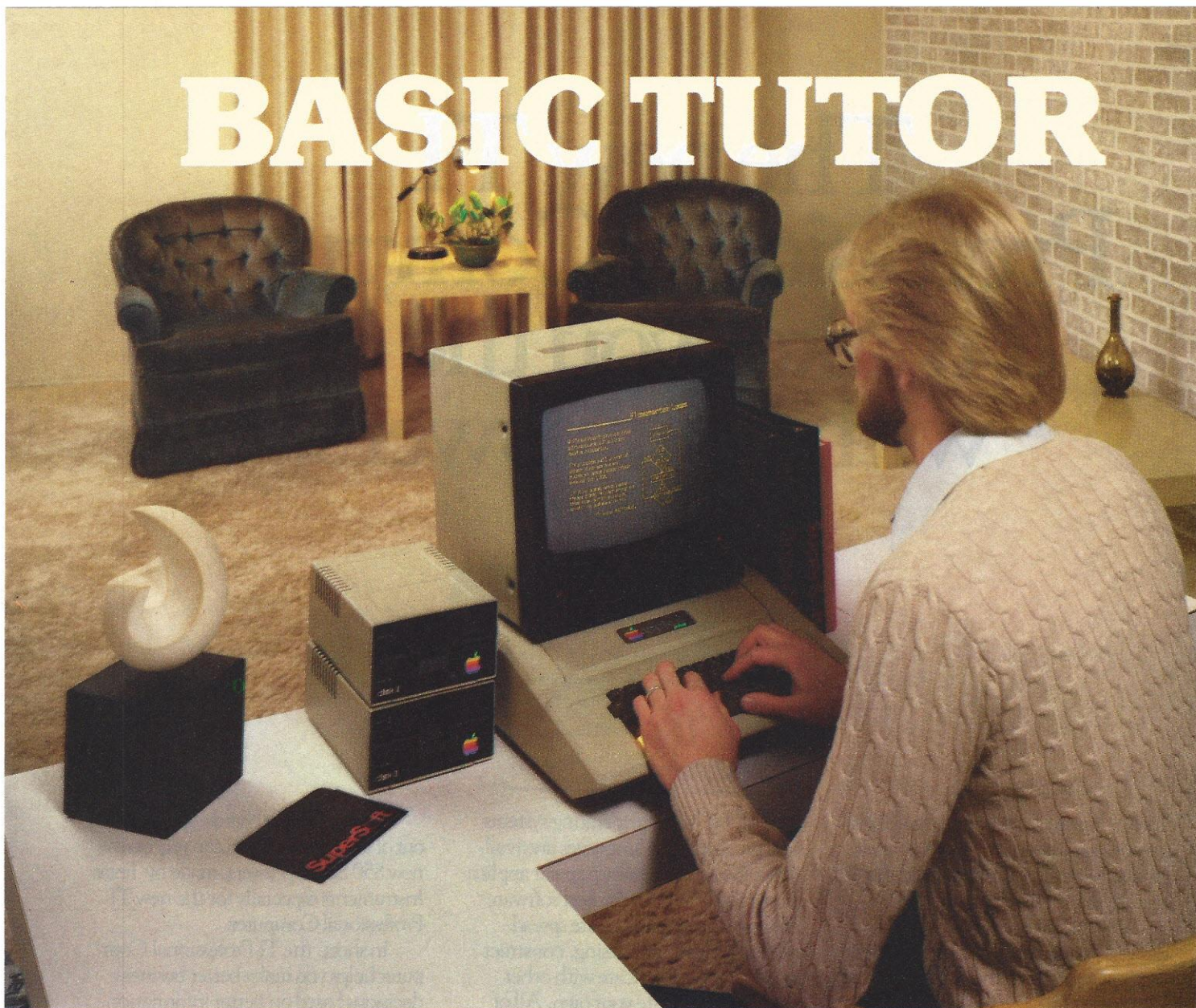
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## Do You Know Enough To Start Programming?

### SUCCESSFUL SOFTWARE FOR SMALL COMPUTERS

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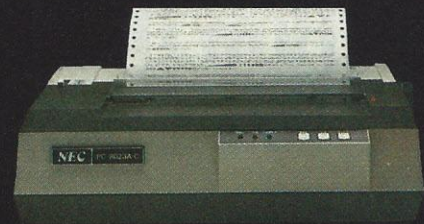
**D**uring my writing career I have frequently heard the remark, "You know, I can't write to save my life," or something in a similar vein. I often gently remind the speaker that writing is a form of communication, and the speaker usually has a good command of another medium, the spoken word. And if you can speak English, it's possible to learn to write competently. Dr. Graham Beech, a British computer science professor, evidently feels the same way about computer programs. If you have some understanding of BASIC, it is possible to design and write elegant computer programs. I agree strongly with Beech's premise.

*Successful Software for Small Computers* is a welcome attempt to bring the principles of structured programming to BASIC users. Back in the early 1970s—before the personal-computer boom and about the time when BASIC was making its first appearance—computer programming was revolutionized by the advent of structured programming. Up to that point, most programming was characterized by a preoccupation with detail—a style that became known as the "bottom-up" methodology. Even flowcharts were rarely used effectively and were often drawn up after the program was completed. To the outsider, programming appeared to be a black art.

However, a few programmers were using a methodology—now called "top-down" design—which involved a formal structuring of a programming problem followed by its breakdown into simple building blocks and, much later, translation into lines of code. Not only were complex problems more easily handled by the top-down design, but the resulting computer programs were often more efficient and could be more easily understood by others. Now such structured programming methods are widespread for all types of computer applications.

It is this form of structured program design that Beech attempts to present to BASIC programmers, and he does so remarkably well. He begins with a brief explanation of the principles of structured programming, and describes the root framework for applying the principles to BASIC—a Program Description Language (PDL). PDL is based on five simple constructs that can be used to describe almost any programming problem. In fact, just attempting to define the problem with the rules of the PDL will often clarify the problem for the program designer.

Beech then shows how PDL statements can easily be translated into Microsoft BASIC statements. If you have never seen this technique, the book's opening chapter will be a real eye-opener. Using structured programming gives the kind of insight into programming that the sudden ability to think in a foreign language gives to a language student. Every BASIC programmer should read this first chapter. Few readers will be able to stop there.



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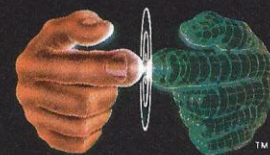
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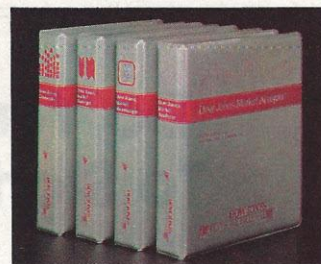
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## BOOK REVIEWS

Subsequent chapters show how the PDL can be used for working with static and dynamic data structures, for file handling and sorting, and for continuous and discrete simulation. While the sections on simulation require some background in calculus, earlier chapters can be understood with no more than a good high school math background. This book is not easy reading, however, and the examples and exercises should be worked through so the reader can understand the principles involved.

One minor criticism of this book is that the quality of the printed program listings varies from passable to terrible. Many listings are directly reproduced from a dot-matrix printer that appears to need a new ribbon.

This comment aside, *Successful Software for Small Computers* is a fine addition to the literature of BASIC programming, and deserves to be on every serious BASIC programmer's bookshelf. If, as it should, this book converts readers to structured programming, I also recommend *The Elements of Programming Style* by B.W. Kernighan and P.J. Plauger (McGraw-Hill, 1974), a classic published for FORTRAN and PL/1 programmers.

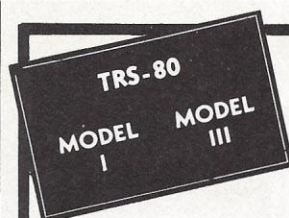
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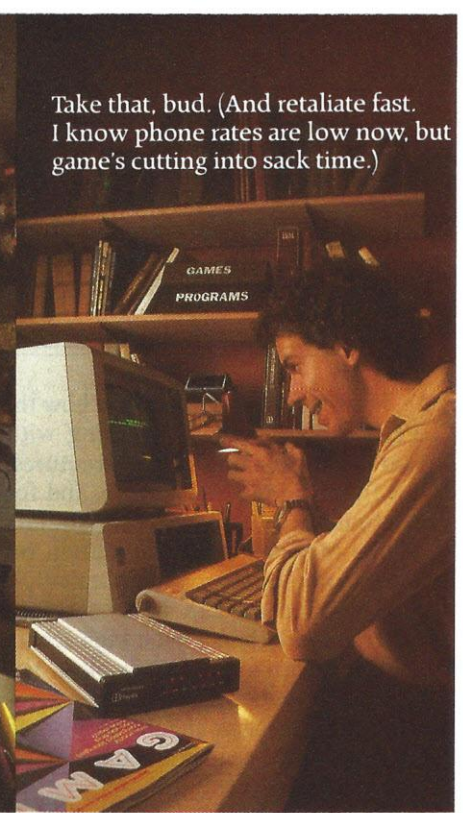
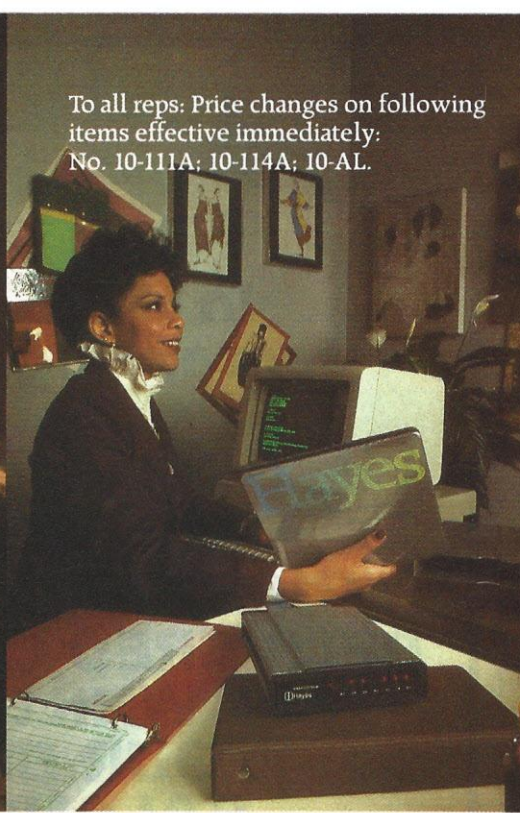
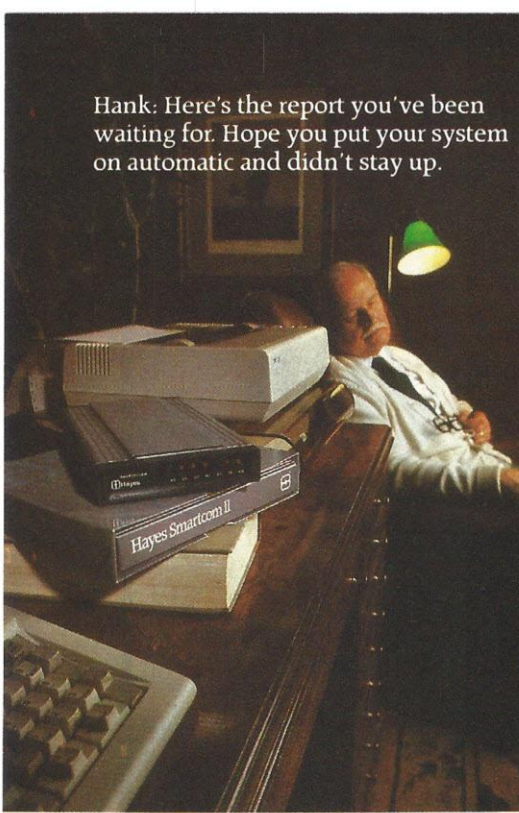


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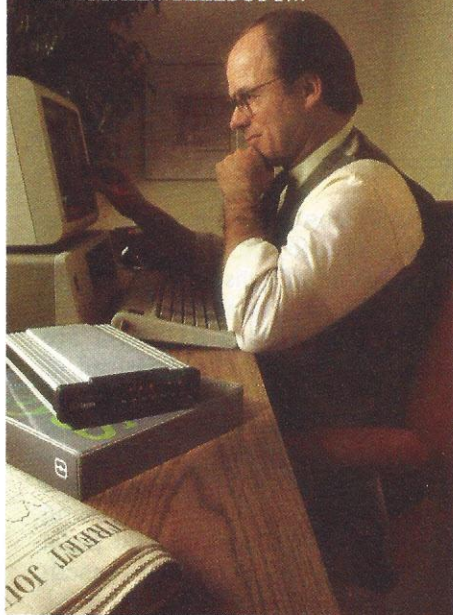
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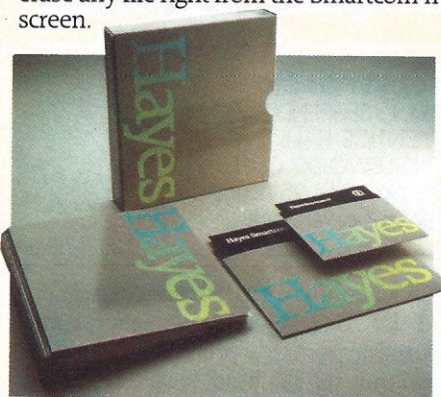
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## BOOK REVIEWS

ego aside for a few hours, turn on your machine, open *The Genie in the Computer*, and prepare to have some fun while learning the fundamentals of programming. Simpleminded language or not, this book will have you writing a program by the time you finish page two, which compensates for whatever flaws it may have.

The book's first seven-line program introduces you to the genie, which is a face with an X for each eye and three Xs for a mouth. At first this format might seem childish and hardly worth the trouble, but it's the foundation upon which the rest of the book is built. By the time you get to the end, you'll be able to change the genie's face, teach the genie to dance, play games like Hangman, hold "conversations" with the computer, create a "movie" in which the genie stars, and have a few handy programs for time management and a personal telephone directory.

*The Genie in the Computer* uses the self-test technique, including programming exercises. Another of its attractions is its graphics. Each time a new aspect of programming is introduced, it's accompanied by a large, clear, and unmistakable symbol representing that aspect. For example, "sequence" is represented by a series of vertical arrows; "loop" has the same arrows arranged accordingly. Once introduced, these symbols are frequently and generously used throughout the book so the reader knows exactly what function any given part of the program is expected to perform.

Kohl, Karp, and Singer have meticulously addressed those maddening little details so easily overlooked by a novice. For instance, they admonish the reader to "be careful: an @ entered while pressing Shift causes an error even though it looks right on the screen." Elsewhere, they call attention to the fact that there is a space between two sets of quotation marks. Any novice who has gone through a computer or software man-

ual will appreciate that sort of hand-holding. As the authors admit, "Some useful statements are not covered in this book. For these see the Radio Shack BASIC Manual." That seems fair enough; there is a limit to how much can or should be taught to a rank beginner.

*The Genie in the Computer* takes a lot of the mystery and terror out of programming, which should be a boon to TRS-80 owners.

One final note: The statement on the cover that this is the "TRS-80 edition" suggests that there are other versions. There aren't. And, according to a spokesman for the publisher, other versions are not planned.

—Marvin Grosswirth

## Food for thought

### BYTEING DEEPER INTO YOUR TIMEX/SINCLAIR 1000

MARK HARRISON  
JOHN WILEY & SONS, INC.  
NEW YORK, NY  
160 pp., \$12.95

The cover of this book shows a Timex/Sinclair 1000 with a missing chunk, as though it had been broken like a piece of chocolate. I'm pleased to report that reading the book is slightly easier than attempting to chew on the computer. Not that the book is worthless, but it resembles a meal I've had so often before—an enhancement of a computer manual.

Mark Harrison, an English computer scientist, has written what is essentially an extended user's guide to the Sinclair ZX81, the British version of the Timex/Sinclair 1000. In fact, other than its cover and introductory note, the book's references are to the ZX81 and not to the Timex computer. Virtually nothing has been done to Americanize the text, and words such as aerial (for antenna) and mains electricity (for power line)

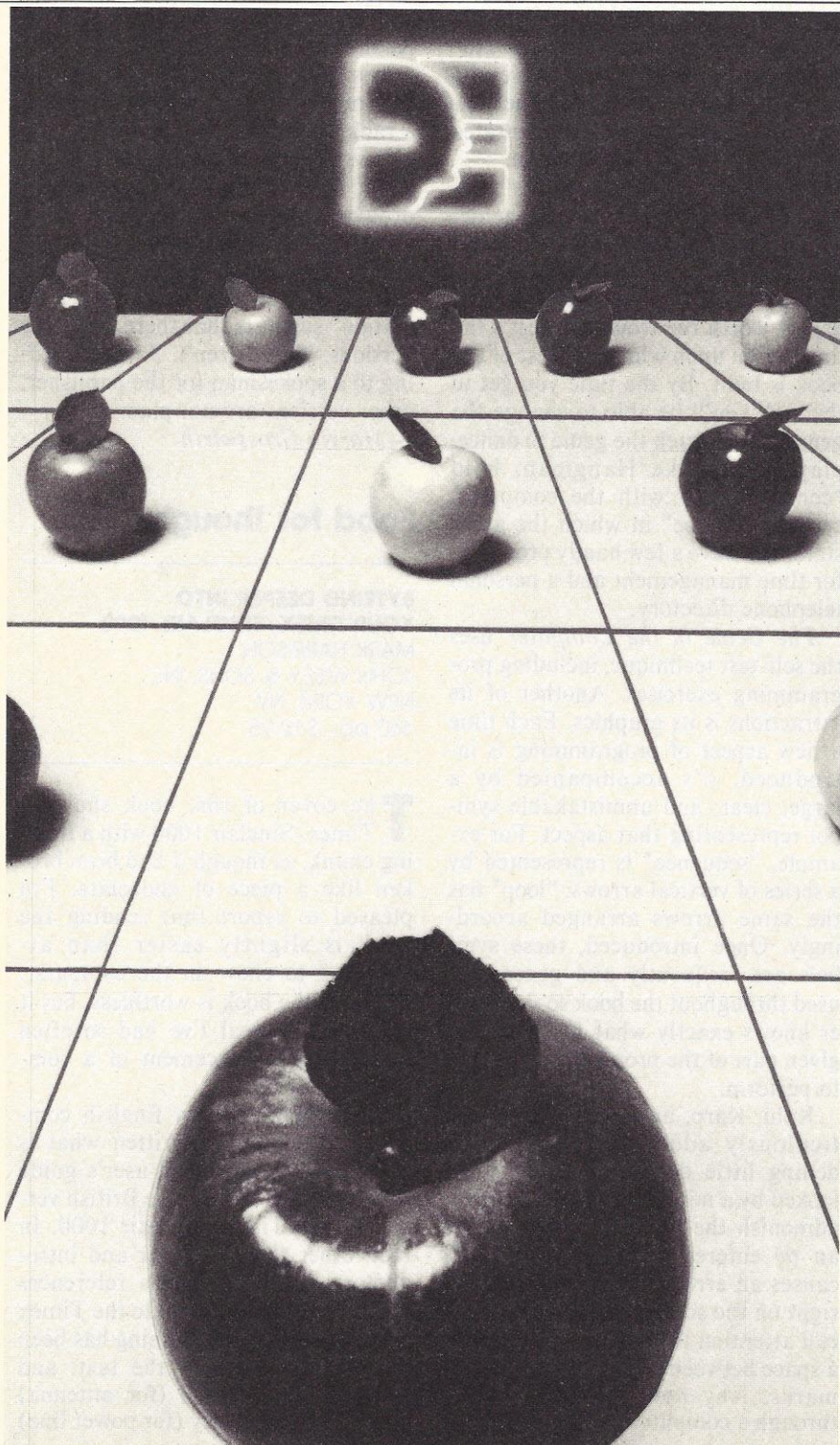
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### BOOK REVIEWS

are still included. While this is not a serious flaw, the differences between the machine's English and U.S. keyboards are not explained. For example, NEWLINE and RUBOUT are used throughout the text instead of ENTER and DELETE. I would have expected the publisher to take more care in preparing the U.S. edition.

The content of *Byteing Deeper Into Your Timex/Sinclair 1000* is a useful extension of the Timex manual. But a Timex owner would probably benefit more from *Timex/Sinclair 1000: Programs, Games and Graphics* by Robin Jones and Ian Stewart (Birkhauser Boston, Inc., 1982), reviewed in the March 1983 issue of *Personal Computing*, page 158.

—Jeffrey Bairstow

### The games people play

#### POCKET MAGIC

BILL L. BEHRENDT  
PRENTICE-HALL, INC.  
ENGLEWOOD CLIFFS, NJ  
96 pp., \$17.95 hardback;  
\$9.95 paperback

**T**he eminent British lexicographer, Dr. Samuel Johnson, once compared a woman's preaching to a dog walking on its hind legs: "It is not done well; but you are surprised to find it done at all." That was precisely my reaction to this book of 25 games for the TRS-80 pocket computer and its look-alike made by Sharp. Just as a dog is not built for bipedal locomotion, the TRS-80 PC-1 is not designed for computer game playing.

Indeed, the author admits that considerable imagination is required for many of the programs he describes. For example, he suggests that an explosion can be represented on the PC-1's single-line LCD readout with an asterisk, to which I can only comment, "\*\*\*\*"

Behrendt's games are certainly in-

genious, and he is to be congratulated. But even his efforts cannot turn the PC-1 into a decent game-playing machine. For little more than the price of a PC-1, and certainly for the price of its bigger brother, the PC-2, one can buy a computer that will allow the playing of far superior games. My advice would be to keep your \$9.95 and put it toward the purchase of another computer if you really want to play games.

—Jeffrey Bairstow

## Dick and Jane meet IBM

### USER'S HANDBOOK TO THE IBM PERSONAL COMPUTER

JEFFREY R. WEBER  
WEBER SYSTEMS INC.  
CLEVELAND, OH  
294 pp., \$13.95 paperback

Folks over 40 probably remember the "Dick and Jane" readers—those sophomoric stories of America's perfect family whose mild adventures helped first- and second-graders learn the English language. It is not known whether Jeffrey R. Weber is old enough to have written—or read—any of the Dick and Jane stories, but he certainly could have qualified. One is tempted, in the early pages of the book, to say, "All right Weber, we know all that. Get on with it." One would be wrong.

Many new users have never touched a computer before confronting the one they just purchased, naively believing the ads and the dealers—namely that anyone this side of mental retardation can learn to operate one within minutes after it's plugged in. For such people, an adult-level Dick and Jane approach is exactly what's needed, and Weber uses it admirably.

For example, "[The] capacity to

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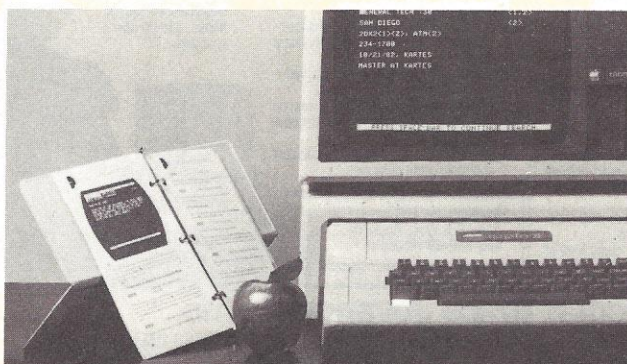
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## BOOK REVIEWS

read or write data at a particular position is known as random access. Disk drives are known as random access storage devices. On the other hand, in cases where data must be read or written in a consecutive order, the accessing is known as sequential access. A cassette tape recorder is known as a sequential access device." This is not an example of great literature, but it's direct, clear, and understandable. So is the rest of the book.

Weber begins with a brief, general introduction to personal computing, followed by an introduction to the machine under discussion. In his unflagging style, he guides the reader through each of the Personal Computer's components, systems, and

subsystems, skillfully interweaving general information and machine specifics. There is little need to flip back and forth in search of a half-remembered definition. For instance, in three short paragraphs, he gives a working explanation of CPU, ALU, and microprocessor. The next paragraph begins: "The microprocessor used in the PC..."

In this manner, the IBM Personal Computer user is taken through installation, trouble-shooting and maintenance, and detailed sections on using IBM DOS and BASIC. There are also command reference guides and appendices with DOS and BASIC error statements and what to do about them. Throughout, diagrams, illustrations, and tables follow

the Dick and Jane style.

The only superfluous material in this handbook is the section on how to unpack the IBM. Someone who needs this volume has probably already removed the machine from its swaddlings. But anyone who purchases an IBM Personal Computer should buy a copy of this book at the same time. In fact, IBM should be giving one away with every machine it sells. Unfortunately, it's not.

—Marvin Grosswirth

## What else?

### WILL SOMEONE PLEASE TELL ME WHAT AN APPLE CAN DO

GLENN M. POLIN, EDITOR  
STERLING SWIFT PUBLISHING CO.  
AUSTIN, TX  
136 pp., \$12.95 paperback

Three questions immediately come to mind when leafing through this book: First, why wasn't it called *Will Someone Please Tell Me What a Personal Computer Can Do*? Second, inasmuch as one of the Apple's accomplishments, according to the last section of the book, is word processing, why was the question mark left out of the title? And finally, why was this book published?

The answer to the first question becomes obvious when one learns, upon reading the back cover, that the book's editor is "Manager of Education Market Development for Apple Computer." But this little volume doesn't seem to reveal that an Apple is capable of doing what many other comparably priced personal computers can do.

The book's eight sections, each written by a different "expert," discuss how Apples are used for accounting, financial planning, investing, education, music, simulation, and word processing.

Dyed-in-the-wool city types might find some revelations in the section

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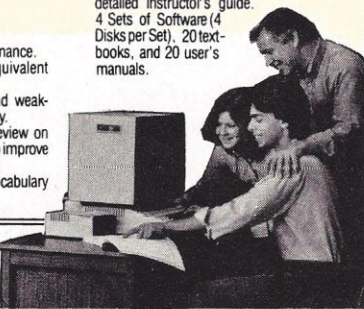
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CIRCLE 69

entitled "The Apple in Agriculture," which is not a treatise on McIntoshes and Rome beauties, but on how personal computers are figuring significantly in farm management. Agriculturist Neil Clemmons, who wrote the section, says that the user of B.O.A.R.S. Hog Management software "receives a daily print-out showing which sows should be checked for breeding, which ones are coming into heat, and which ones are due to farrow. The program tracks which boar sired the litter. It can even recommend a boar for breeding—computerized dating at its best!" Best for whom he does not specify, nor does he explain what the acronym B.O.A.R.S. stands for.

Each section is followed by a list of appropriate Apple software, although for some the list is small. Still, the book is not meant to be a complete software catalog, but rather offers a representation of what's available.

It's important to remember, however, that *Will Someone Please Tell Me What an Apple Can Do* does not tell you, except in broad terms, how to do it. For that you need the software. Whether you need this book to tell you that is another question—without a question mark.

—Marvin Grosswirth

## Programmers wanted; familiarity with science or math preferred

### BASIC EXERCISES FOR THE IBM PERSONAL COMPUTER

JEAN-PIERRE LAMOITIER  
SYBEX, INC.  
BERKELEY, CA  
251 pp., \$13.95

**T**he title of this book reminds me of the plethora of books on exercising for personal fitness. While

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## BOOK REVIEWS

such books are valuable, their content alone does not often motivate the slothfully unfit. So it is with *BASIC Exercises for the IBM Personal Computer*. This is a worthy book, but the reader will need to be strongly motivated to work conscientiously through its exercises.

I recently took delivery of an IBM Personal Computer and searched for the motivation to work through Lamoitier's book. My motivation came from the BASIC manual supplied with the IBM machine. Like most IBM documents, the manual is thorough but about as interesting as the phone book. Unlike the manuals produced by some of IBM's competitors, the BASIC manual has no tutorial section and, indeed, sternly warns the reader that "You should have some knowledge of general programming concepts." Quite so. That knowledge is supplied by Lamoitier's book.

I would caution the reader, though, that a scientific or mathematical background is helpful for understanding the book's BASIC exercises. The author is obviously a FORTRAN programmer, and his exercises are mainly mathematical. If you have never heard of Armstrong numbers, for example, or you think polynomials are a nuisance, this book is not for you. Although the author includes a chapter of games, the rest of the book is very serious. There are exercises based on integers, geometry, equation solving, operations research, statistics, and so on. Thus, this is not a book for the uninitiated.

The avid reader of personal-computing literature may have seen this book before. The author has also published *Fifty BASIC Exercises*, which later became *BASIC Exercises for the Apple*. Its most current version is *BASIC Exercises for the IBM Personal Computer*. Fortunately, Microsoft BASIC is the industry standard, so little revision is required to convert the programs from one computer to another.

—Jeffrey Bairstow



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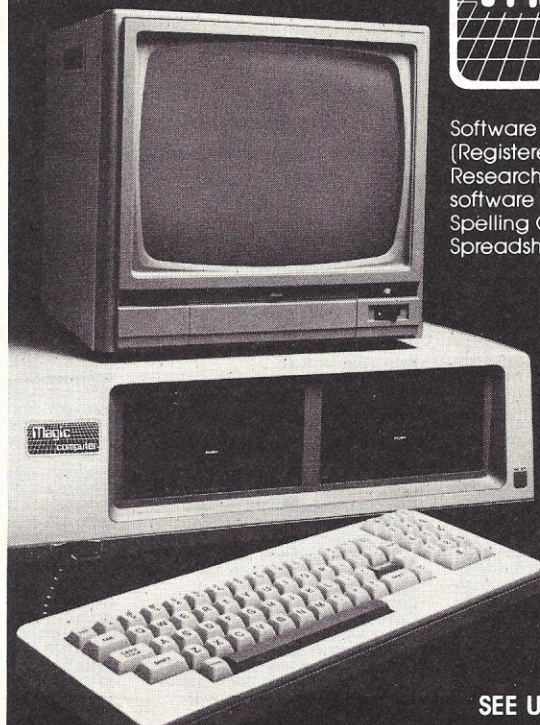
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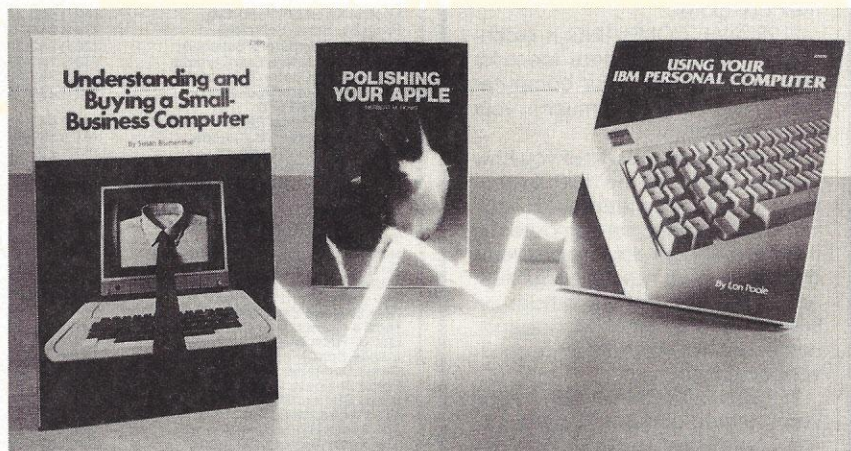
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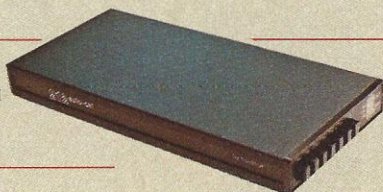
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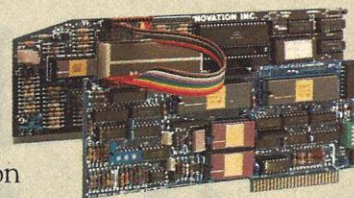
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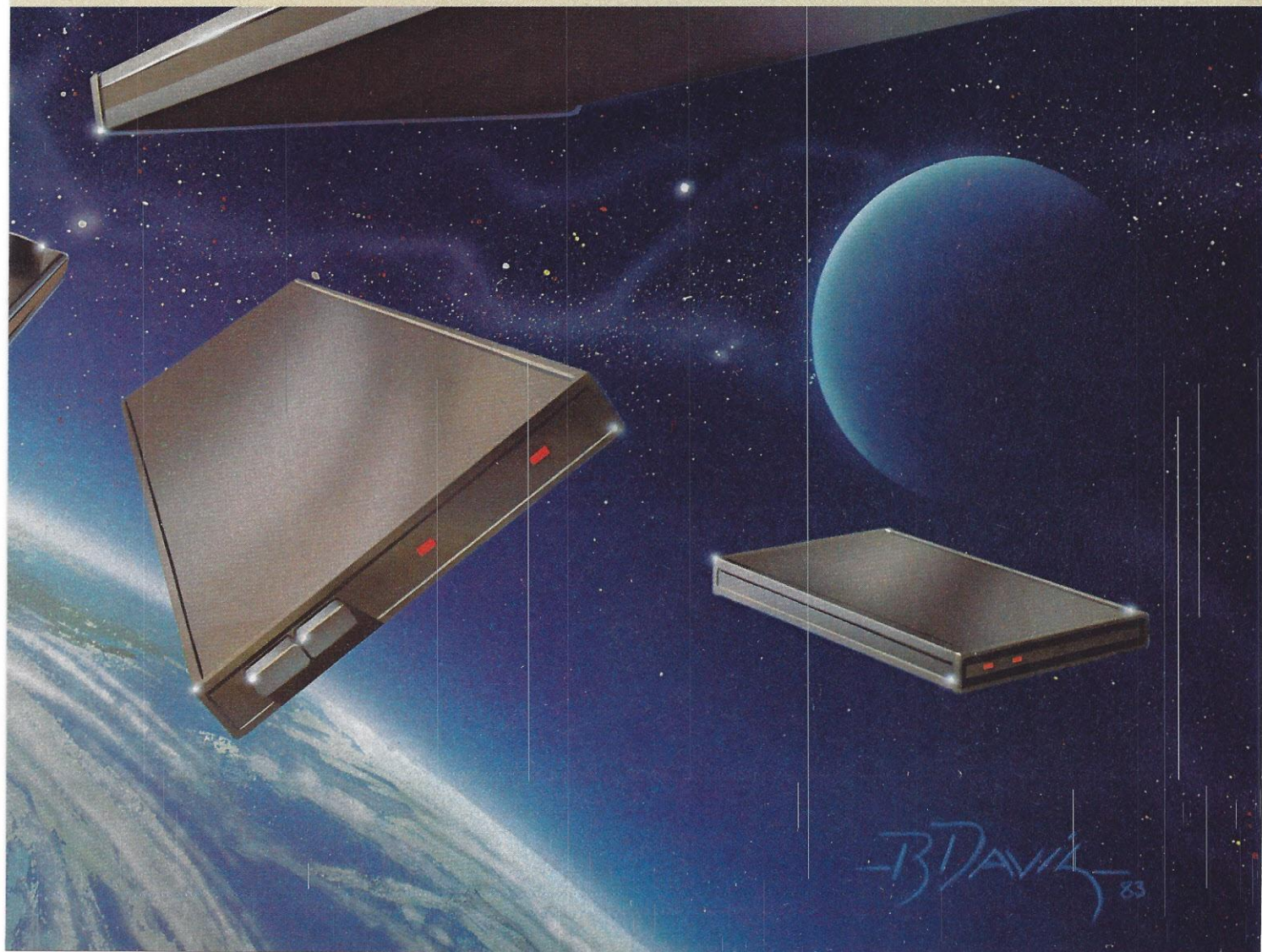


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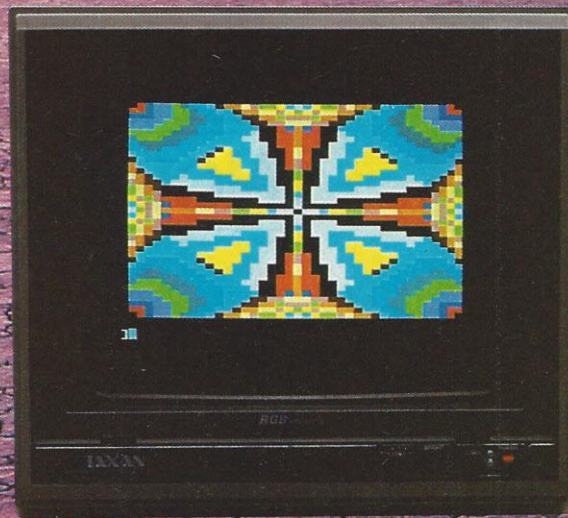
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ADVANCED

## BUILDING A FORTUNE

(continued from page 60)

its fellows for "burn-in." This process, duplicated in every computer factory, involves running each machine for some time, on the theory that if it's going to break down, it's likely to do so early in its life. The exact period of time that Fortune burns in its computers is secret; Rotow shrugs, however, and says that in general, if nothing happens in the first four hours, the machine is probably going to make it.


Computers intended for Europe are run on a separate generator, specifically installed to simulate European current and voltage. And some 32:16s are detained for a lengthier examination, driven by disk com-

mands that keep the screen constantly busy—"TESTING BEGINS. TWO SECONDS WAIT. SUCCEEDED. TESTING BEGINS..."—for days at a time.

The computer that is finally packed into the blue-and-white carton next to the shipping dock is a thoroughly tested device indeed. And what's remarkable is how quickly the results of that testing are fed back into the manufacturing process. At Seagate, for example, there's a meeting every day at 5 p.m., when department heads gather to examine a computerized record of precisely how many drives failed during the course of the day—and why.

Fortune's Rotow sums up the rationale behind the constant testing:

"We're dealing with vast complexity," he says, "even at the level of the components that go into the 32:16. Look at the 68000 microprocessor alone—that one chip is the equivalent of roomful of equipment a few years ago."

That explains, to a great extent, why the Fortune assembly line would probably baffle Henry Ford. This kind of manufacturing, while superficially similar to assembly lines of old, is fundamentally a different game. "It's changed," Rotow says. "It's a thought industry now, rather than a muscle or sweat industry. We're adding value at higher levels of integration. In the end, we're not even selling chips or hardware. We're selling functionality." 

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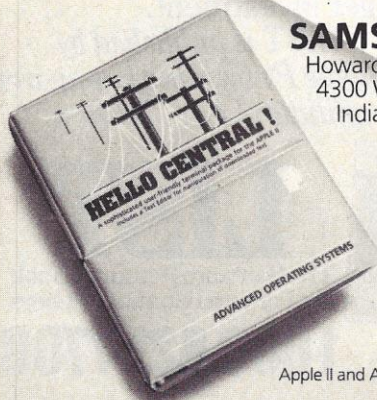
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CIRCLE 66

## BUSINESS

### MADE TO MEASURE SOFTWARE

(continued from page 85)

he'll need a hard-disk system. "Don't get yourself into a system that you're going to outgrow quickly," he warns. "Try to anticipate your future needs."

"If we'd thought about that, maybe we would have gone with the hard disk right at the beginning. We'd have saved a few dollars in the long run because we wouldn't have to make programming changes to accommodate the larger system." Nevertheless, Riesenberg doesn't dwell on such oversights. His staff is putting the software to good use today and he'll cross the hard-disk hurdle when he comes to it.

### The bottom line

How much can custom software contribute to a larger profit? Riesenberg expects that his answer to that question will be quite a tidy sum. His customized order entry system cost the company in the neighborhood of \$5000. When compared to the prices of packaged software, that seems a sizable chunk of money. For instance, there are order entry programs on the shelf that retail for \$250 to \$600.

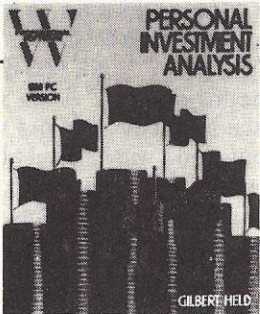
What possesses a person to spend more than eight times the amount of the most expensive packaged product on the market? Riesenberg responds: "When we turn the computer on, we're looking at an order entry system we developed."

"The manual handling of orders didn't make money for us," Riesenberg says. "The computer and the customized programming freed up time to pursue new orders and make new sales. When you're a small company, like we are, you've got to make the most of every individual's time."

Customized programming has made their system unique to their business. Because of this, the computer never forced them to change their way of doing business. On the contrary, they forced the computer to do business their way. Riesenberg is sure that it's the only way to go.

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### **MARSHALL GRAHAM'S CUSTOM WORKSTATION**

**M**arshall Graham's workstation is more than just office furniture, cleverly designed to fit into a particular corner or impress important clients. It is a scientifically designed piece of equipment that has as much to do with fostering productivity as it does with the personal-computing hardware it supports.

The equipment, peripherals, and the rest of the workstation cost about \$26,000 when it was built two years ago. Each segment of the L-shaped wooden desk top, pedestals, and CRT enclosures was carefully designed by Lawrence Lerner, president of Environetics and one of the best-known office designers in the business.

Lerner's design was based on ergonomic data supplied by Graham. Ergonomics is the field covering the economy of work, including human engineering, systems design, and planning. Ergonomics is what Graham's work as head of Environetics Management Technology is all about.

Graham used ergonomic principles at every stage of selecting the equipment for his workstation. For example, after he selected the two Commodore 8032 personal computers, he removed the keyboards and CRTs from their housings and had them built into the workstation—to set the screens to the proper eye height and the keyboards to the proper distances and angles to his arms. He uses these computers for word-processing and data-base programs. He uses a built-in VIC-20 with color monitor, to work out sketches of office plans and do calculations of office-equipment costs.

The wooden surface of the desk top is at the right height for Graham's anatomy, taking into account the location of a cushioned wrist pad that keeps his hands at an optimum 10-degree angle to the keyboards. A quarter turn to either side puts him within reach of every corner of the workstation—including the pedestal where the one-megabyte dual disk drive is located. With a full turn he can reach virtually every point in his

office; the compact space is designed for efficient work, not luxury.

A low housing running across the desk top contains the CRTs that display the systems' outputs. To the left of this, at the junction of the desk's right-angled surfaces, sits a large video monitor for the French-made Telewriter II, an electronic blackboard that allows real-time graphics telecommunications, distributed by FTC Services of New York.

On the desk top is a Northern Telecom Displayphone, which is a combination computer and telephone that displays numbers to be called, and dials those numbers at the push of a button. Also on his desk is a standard telephone for data communications from the Commodore computers through acoustic modems.

The right side of the workstation supports four devices—a Hitachi color monitor, a Talos digitizer, the VIC-20, and a PET 4022 printer. These give Graham the equivalent of a designer's work table in the space of a three-foot cube.

Enhancements are in the works. Graham plans to upgrade the 8050 disk drives to newer 8250 drives, which will double his available storage and minimize the number of times he has to change a disk. He will also expand the 32k memories of his 3032 computers to 96k by adding 64k Z-RAM modules. And he'll upgrade the VIC-20 to a Commodore 64, which handles expanded graphics software.

There are other possibilities as well. The Telewriter can be expanded to allow six-way communications, instead of the present two. Graham might get a portable computer to take on his travels. He's also considering a network that will link all his U.S. offices and those abroad into one information system.

Although Graham's own setup was expensive, the cost of a workstation depends on its equipment. "A good design could be produced for under \$7000," says Graham, "depending on the hardware you buy."

### **MODERN MANAGEMENT TEAM**

*(continued from page 92)*

his name, anyway? Well, see if you can get me his number.' Then she'd have to take time out from her work to figure out who I was talking about, locate him and call me back.

"That was a time-consuming process. Here I'm trying to produce something, and because of my poor memory, nothing's happening. And once she dials the number, that's more time wasted if there's a busy signal, or no answer. Then she has to buzz me back and I've got to stop what I'm doing and tell her to keep trying. With Ozz, it's much faster—entering the information myself helps me remember it better, and my Displayphone automatic telephone dialer helps speed the call."

Chaveco maintains the article and conference files for Graham. She inserts articles into a preformatted Ozz file using a system of key words. "I skim some 20 to 25 magazines a month," Graham explains, "and mark the stories I want her to file, circling or underlining a key word in each article. But now I don't have to spend time cutting and filing the articles; Yvette does it for me."

"I enter the title of the article, the name of the publication, the author, and other data onto the floppy disk under the appropriate key-word file. Then I clip the article and store it," Chaveco says. "Cross-referencing the article under several different key words becomes an easy task."

"The nice thing here," says Graham, "is that if I saw something on, say, distributed processing, but can't remember where I saw it, I can go to the Ozz file and find the reference I want under the proper key word. I no longer have to riffle through several different subject files in the file cabinet trying to look for the clipping. It keeps things neater, and I don't have to bother Yvette repeatedly. Database management has streamlined the way we operate."

Chaveco has also created files of

vendors of office-automation equipment and services related to Environetics's consulting businesses. The files are color coded, making it easier to avoid duplicating files, and all the files are indexed on Ozz.

"I check the vendor list first to see if a particular company is in the files, under the appropriate color code. If it's not there, I create a new file. It saves a lot of time," she asserts, "since I don't have to go into the files themselves." Chaveco has also made up a similar set of files of office equipment and software that tracks who manufactures or distributes what software for what machines—information that is invaluable in designing a client's office that will truly meet his needs.

"I've also built a conference list for him on the Ozz software," says Chaveco. "In this field there are dozens of conferences every year. I enter the name of the conference, the dates, and other information into the file so we can keep track of all of them. Then I file the fliers and other information. When Mr. Graham wants to know about a particular conference, Ozz has the basic information. If he needs more detailed information, the entry tells him where the fliers are filed."

### Sharing the wealth

Graham's enthusiasm for personal computing has spread to other executives and departments within Environetics. Lerner, the company president, has become proficient in personal computers and now has a 16-bit Altos computer at his home in Beverly Hills. His CBM 8032 has gone to his secretary in the Los Angeles office. There are 10 other CBM 8032s in various Environetics locations—seven in the New York office and another in Los Angeles, one in Washington, D.C., and one in London. Plans call for eventually placing personal computers in each of the firm's branch offices in other cities.



## Getting The Show On The Road

**R**aymond Weiss, a booking agent for classical musicians, does all his tour planning work, accounting, and tax calculations for his ensemble clients on a series of personal computers spread over two offices and a motor home. The computers allow Weiss to be out on the road with his clients, without falling behind in his administrative duties.

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This friendly new software was written by people who have worked with small businesses for many years. It offers all the features your small business needs in a no-nonsense, straightforward set of programs that is efficient and inexpensive. Also, Hayden's Simplicity Accounting bookkeeping systems are fully integrated and run under the popular CP/M\* operating system.

## Easy to Use

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The General Ledger module has two distinct parts: General Ledger posting with related reports, and Financial Statements. It can be used with the other programs in the family or as a free-standing system. And

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## SPECIAL REPORT

### WORD PROCESSING

(continued from page 117)

gram was even easier to use than Screenwriter, we thought, and that seemed to outweigh the requirement for the 80-column board for the Apple. But Easy Writer is written in FORTH, a computer language that's really an operating environment as well. FORTH files aren't compatible with Apple DOS files, so we couldn't get a communications package to read them. IUS said it was developing a communications package that would solve the problem, but the company had other priorities, and we needed the program right away. That's how we started using P.I.E. Writer.


Whatever your word-processing application, you will probably want to know how long a document you can prepare with a word processor. The answer to this question isn't simple.

On the one hand, memory-based text editors are limited in size to the amount of memory in the computer less the amount the text-processing program takes up, less system overhead. The remaining memory can be used as a text buffer for the editor. Depending on the sophistication of the text editor, there may not be a lot of space left for text entry. P.I.E. Writer, running in a 48k Apple II, leaves about 19k for a text buffer, so you can see that about 29k is taken up in program and system overhead. The text buffer is still big, of course, but articles for *Personal Computing* frequently go beyond the limits of the text buffer. When that happens, the only solution is to begin another file in memory, having saved the first file to disk. Most memory-based word-processing programs like P.I.E. Writer allow you to make a chain of files on the disk when it comes time to print out the file, so the document is printed continuously. But it isn't easy to alternate between the first part of a document and the second, because while you're working on one part, the other is sitting on another disk.

The way around this is to use a disk-based system—one in which the file you're working on is permanently on disk, and additions to the document are automatically written to disk. With this kind of a system, there's virtually no limit to the size of document you can work on—its single-side disk capacity is 135 thousand characters. But you do sacrifice speed, because disk access is slow compared to the speed at which a character can be printed on the screen.

Then there's the problem of program overlays. On many systems the editor and formatter won't fit into memory at the same time. So when you need to print your document, you have to load the subprogram that will do the actual printing. This can be time-consuming, especially if you're like I am. I often use P.I.E.'s formatter to print complex material to the screen to see what it will look like. Typically, after I see it I'll want to change something in the document, so I have to get back to the editor, and reloading it can take tens of seconds. That may not seem like a lot, but wait until you've done it four or five times.

The way around it is to get a program that prints from its editor, or one that shows you the formatted output on the screen, or loads the formatter into memory with the editor. This last option won't be available if your computer has a relatively small memory.

Armed with this basic knowledge, you're probably ready for your first foray into the marketplace. Before you go, take a look at the comparison charts included in this buyer's guide, to see which features are available. If you're still confused, head for your computer store and ask for a demonstration. This should answer a lot of your questions about word processing. Once you've seen the functions in action, decide which features you want, and pick two or three packages that meet your criteria. Then try them out. 

*Play can relax  
adults and restore  
perspective and  
creative zest.*

**WHAT'S IN A GAME?**

*(continued from page 69)*

If we reboot, they'll still be there, as if this adventure hadn't happened at all."

**The bottom line**


While I had played my share of computer games, I'd never had the kind of vivid experience I had playing Wizardry. It seems, when I think about it, that many of the games I had seen—and tried—attempted to be too real. Personal-computer graphics are still primitive; it's one of the prices we pay for low cost. Attempting to make the game representation too real makes it look more like a game. It robs our imaginations of the opportunity to fill in the miss-

ing details—something that a good cartoonist never takes away from his audience. A simple representation will allow us to let our imaginations loose, and when that happens, you end up with more than you bargained for.

"I think," says Adams, "that anyone who works at a nine-to-five job soon finds himself working with restricted thought patterns. He may not realize it, but it happens. He gets into a rut. Game playing makes him step outside that rut. It stretches the mind. Game playing provides the exercise my mind needs."

Yet the question remains. Are there any real-life benefits to playing such games? The official jury is still out. Further study will be needed be-

fore the experts feel safe enough to issue their yea or nay. But for Adams, and thousands of others, these games offer a way out of the day-to-day pressures and dreariness of the daily grind.

Enlightened school administrators are rushing to place computers in their schools—and the urgency with which they push the matter seems a remarkable benchmark of their evaluation of the need for personal-computer literacy. Games, at least the best of them, are one way to help motivate the young toward that literacy. They help adults in the same way. And it may just be that one day very soon computer games will be discussed as fundamental accoutrements for living a richer life. 

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Adds a second level with dungeons and more Questing.

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It does have some limitations. It takes at least 8k of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, \*, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20-page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI, TRS-80 Color, VIC 20, or Commodore 64.

**SEAWOLFE** — ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color.

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## New Systems Promise More Power For Your Dollar

*Each month Personal Computing scans the hardware market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in the index.*

### TWO NEW SYSTEMS FROM TEXAS INSTRUMENTS

**T**exas Instruments has introduced two new systems: the Compact Computer 40, a battery-operated system that fits in a briefcase, and the TI-99/2, a 16-bit computer console with a price tag of \$99.95.

The Compact Computer 40 is the first in a series of computers for professionals. It is designed for use as a small desktop cordless computer and a data communications terminal. It is also possible to use the CC-40 as a portable. The system, with a suggested retail price of \$249.95, is expected to have a broad range of applications for professional, technical, and personal use.

The CC-40 is programmable in Enhanced BASIC, and can run software loaded from plug-in, solid-state car-

dable to 16k. A plug-in module port is provided for application software of up to 128k ROM. The port can also be used to expand the RAM of the computer. The back of the console houses a Hex-bus peripheral connector allowing connection of any Hex-bus-compatible peripherals.

The CC-40 console weighs 22 ounces. Its display, a scrollable 31-character liquid-crystal display, is capable of displaying upper- and lowercase characters. It also signals users with 18 indicators including shift, control, I/O in progress, error, uppercase lock, low battery, and six user-settable flags.

Four AA alkaline batteries power the console for up to 200 hours. Memory contents are retained even when the unit is turned off. The unit may also be connected to a standard 115-volt AC power outlet using an optional AC adaptor, AC9201, which sells for \$14.95.

Texas Instruments offers three low-cost peripherals for the CC-40: an RS-232-C interface, a printer/plotter, and a Wafertape digital tape drive. The company also plans to have other peripherals available soon, including a wand input device, modems, printers, and a black-and-white TV monitor. Each peripheral includes a Hex-bus port and interface cable.

The RS-232-C interface allows direct connection to serial-input printers and modems. With the addition of an optional cable, the interface can connect to a parallel-input printer. The interface, HX-3000, has a suggested retail price of \$99.95.

The printer/plotter, an x-y plotter with four-color capability, uses 2½-inch-wide plain paper. In addition to x-y plotting, it can print up to 36 characters per line. This peripheral, the HX-1000, has a suggested retail price of \$199.95.

The Wafertape digital tape drive, HX-2000, lists for \$139.95. It has a cartridge capacity of up to 48k and a data transfer rate of 8000 bits per second.

TI also has software packages available for its CC-40 in the form of plug-in, solid-state software cartridges and Wafertape cartridges. The plug-in cartridges, ranging in price from \$39.95 to \$124.95, include Mathematics, Finance, Perspective Drawing, and Business Graphics. The Wafertape cartridges, which sell for \$19.95 each, include Elementary Dynamics, Production and Planning, Inventory Control, Photography, Electrical Engineering, and Profitability Analysis. TI plans to have a total of 75 cartridges for sale by the third quarter of 1983.



The battery-operated Compact Computer 40 (CC-40) from Texas Instruments has a scrollable display above the keys.

tridges or from small tape cartridges. The console has 34k of ROM with a BASIC language interpreter. The BASIC is compatible with the TI BASIC used in the company's Home Computer Family.

The computer also has 6k of RAM, which is expan-

The company's second system offering, the TI-99/2, teaches TI BASIC and BASIC-supported assembly language. This system is aimed at the computer novice who wants to learn how to program—the technical enthusiast, engineer, or student.

The TI-99/2 console has a keyboard similar to that of the TI-99/4A. It features monochrome display capability and contains a built-in RF modulator. The included video cable and antenna switch are used to connect the computer to any TV set. A cassette interface cable is also included to connect the computer to a cassette tape player. At the rear of the console is a Hex-bus peripheral-interface connector, allowing hook-up with peripherals



The TI-99/2 features 16-bit power, 4.2k RAM, and a keyboard arrangement similar to the TI-99/4A personal computer.

developed for the company's Compact Computer Family. In that way, the three peripherals now available for the CC-40 can also be used with the TI-99/2.

The TI-99/2 is supplied with 4.2k of RAM, with expansion possible to 36.2k. Included with the console are an AC adaptor, a user's manual, and a demonstration cassette.

Two cartridges are being made initially available—"Learn to Program" and "Learn to Program BASIC," which retail at \$19.95 each. Other cartridges will also be available, and the company plans to have 20 cassette programs for sale soon.

**FOR MORE INFORMATION:** TEXAS INSTRUMENTS, Lubbock, TX 79408. See this product at your local computer dealer.

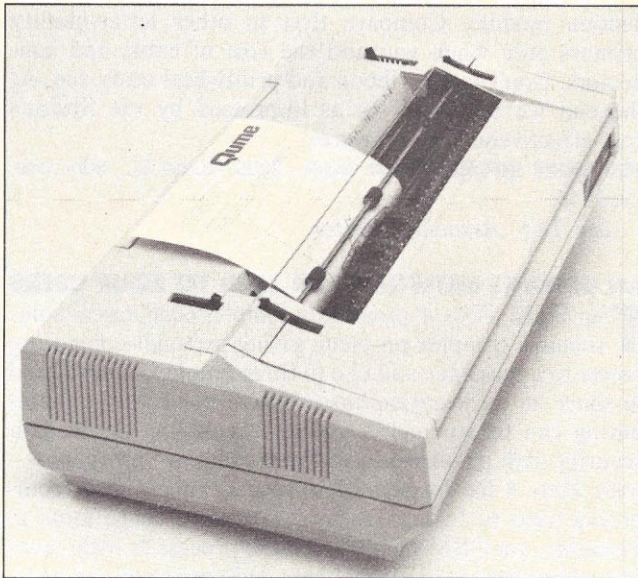
#### FAST LETTER-QUALITY PRINTER WITH NEW EASE OF INSTALLATION

**A** Qume Sprint 11 Plus printer looks impressive enough just sitting there. Less than seven inches high, it could be slipped into a small office without trouble. Unlike the bulky letter-quality printers of yore, the Qume

matches most personal computers for compactness.

The Qume will match most personal computers for compatibility, too. Turn a Sprint 11 Plus around and you'll see a long slot. Into that slot goes a connection module customized for your computer and type of interface, from Apple to Xerox, serial to parallel. A cable trails from the connection module, complete with the appropriate plug. Changing computers next year? Fine—just pop in another connection module (for \$95) and you're off and running again.

Run the demonstration program and you'll see a Sprint—sprint. One model prints at a rate of 40 characters per second, the other at 55. That's equivalent to 350 or 500 words per minute. It zips along mixing regular type with boldface; a "pause" switch lets you change printwheels at will, with more than 100 96-character models available. Later in the demonstration the Qume starts rolling the paper back and forth to make drawings and accurate graphs. It does all this with respect for your ears.



Less than seven inches high, the new Qume Sprint II Plus will match most computers for compactness as well as compatibility.

Qume claims that the printer puts out 63 to 65 decibels—about the noise level in a luxury car going 60 mph.

At this point you may wonder "What about changing ribbons?" Qume cuts down on the frequency of changes by suggesting an extra-long ribbon manufactured by Qume. And we found actual changes took about twelve seconds total—no smudged fingers, either.

Loading paper is similarly easy on fingers. Qume makes a single-sheet feeder (not tested) that appears to connect and disconnect very simply, as does the tractor feed, which we tested. Just blindly jam it in—the tractor

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## HARDWARE OF THE MONTH

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feed fits only the right way and you'd need a small sledgehammer to damage it. You thread fanfold paper onto the sprockets by pushing two paper holes on each side over the corresponding top sprockets. Then start the printer's line feed and it finishes threading itself automatically.

Once your paper's loaded, it's time to use your word-processing program and make the printer work with the command protocols used by most popular software. Here, again, Qume has done its homework. As of this writing you can make full use of the Sprint's features from Applewriter, Easywriter, Scripsit, Sorcim Superwriter, VisiWord, Wordstar—and more on the way.

Qume estimates you should get around 5500 hours (about three years) of use out of the printer between breakdowns. With more than half a million printers in service (most under other makers' names), Qume appears able to make good on this claim. And a self-test routine prints out a statement you can phone in to a service depot for remote diagnosis.

The Sprint 11 Plus's \$1776 price includes one connection module. Compare that to other letter-quality printers only when you add the cost of cable and connectors. Don't forget ribbon and printwheel costs, too. At the end we bet you'll be as impressed by the Sprint's cost-effectiveness as we were.

**FOR MORE INFORMATION:** QUME, 2350 Qume Dr., San Jose, CA 95131.

—Lee Thé, Associate Editor

### AN INSTANT NETWORK FOR TWO TO FOUR USERS

**T**he OSM Zeus 4 provides a simple, economical solution to a complex problem: giving personal-computing power to a manager and one to three employees who need to share an information base. Now a newcomer to computing can set up such a system—including tiered data security with passwords and “need to know” provisions—with Zeus 4 hardware and software. This kind of computing used to take a team of expensive consultants to assemble, yet OSM has reduced the process to little more than plugging in the components and answering the questions on the setup program.

Simplicity starts with the hardware. OSM has integrated several computers, mass storage, and networking circuitry into one 7- by 13- by 15-inch box. It is hard to believe, but up to four electronically distinct computers can be mounted inside that small box! Each computing module includes a separate microprocessor and 64k of RAM. An additional computing module links each computer in the box with mass storage, printers, modems, etc.

Mass storage comprises a 180k or 750k floppy disk drive and a 5, 10, or 15Mb hard disk drive. The latter contains OSM's MUSE (Multi User System Executive) program, which coordinates computers, storage, and peripherals. Moreover, it lets you install and run most

CP/M programs in the Zeus's multiuser environment—all on the hard disk. For instance, WordStar, the popular word processor, works well under MUSE.

The Zeus 4 and the “command” terminal can go on or near your desk. The Zeus 4's polished wood top and fluted styling shame most computers-in-a-box. And it's nearly silent, because the main heat source—the power supply—has been mounted on the back of the computer, obviating the need for a fan.

The other workstation(s) link to this box with simple serial-type cables that can be up to 100 feet long. The same is true for printer(s) and modem(s). If you need more than five peripherals, port-swappers (for about \$100 each) allow more than one device to plug into a given port.

When Zeus is turned on, the hard disk whirrs up to speed and puts MUSE's configuration program on-screen. For security, this program only runs on the command terminal at your desk. It lets you choose which users and/or terminals will have access to which data, letting you block off sensitive information from any terminals or password-holders you wish.

Furthermore, you can set each terminal to come on-line automatically with the application software appropriate to that workstation. The typist can get a word processor, the bookkeeper an accounting package, and so forth. At the same time everyone can access all the application programs placed in the “commons” area of the hard disk. Each user gets his own hard-disk region for personal file storage, too. Only the command-terminal user needs floppies—for entering new programs, making backup diskettes, etc.

MUSE allows all users to boot up the same program at the same time. It just copies the program into everyone's separate RAM. You won't get the performance degradation common on systems that run multiple terminals off one processor. And if two users try to access the same data file in the hard disk's commons area, MUSE provides file and record locking to prevent file crashes.

MUSE further provides spooling and cache memory. Spooling lets you print and still use your terminal. Cache memory speeds throughput, or overall speed, by taking data adjacent to whatever you asked for in a disk access and storing it in a special RAM buffer. Statistically, your next disk access is likely to need data adjacent to the last access; having it in the buffer eliminates disk access time, which is much longer than RAM access.

OSM has tried to make the Zeus as easy to maintain as it is to set up. All the modules come apart with thumbscrews—no tools are needed. And OSM promises a 24-hour turnaround on any module it receives. You also get separate owner and dealer hotlines for hardware and software assistance.

Why not buy four personal computers and a hard disk? You can, but it will cost more and require networking

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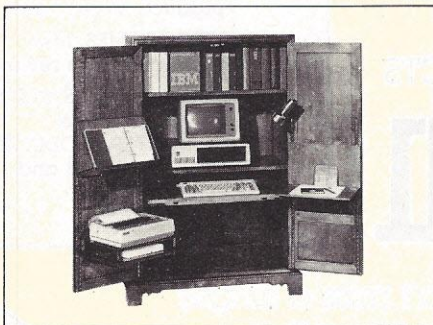
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## HARDWARE OF THE MONTH

software and hardware to link all the equipment. OSM offers a turnkey solution to the two-to four-user problem. You can't expand it beyond four users and 64k of RAM per user, or add special-purpose printed circuit boards, however. But that capacity for expansion would cost more and stray from the Zeus 4's simplicity of installation and operation.

With two \$595 terminals—such as San Francisco's Liberty Electronics 100s—a 180k floppy drive, and a 5Mb hard disk, the Zeus 4 costs \$6785 for the two-user version and \$8975 for the four-user model. Add \$795 for the 10Mb hard disk or \$1590 for the 15Mb version. Thus, you and three employees can enjoy personal computing with shared storage for as little as \$2244 per person, plus peripherals. You'll have a hard time matching such a low cost per user. Once you figure in what your own time is worth, and how little of it you'll need to set up a Zeus 4 system, you're looking at quite a deal.

**FOR MORE INFORMATION:** OSM COMPUTERS, 2364 Walsh Ave., Santa Clara, CA 95051; (408) 496-6910.

—Lee Thé, Associate Editor

## HI-RES BIG SCREEN MONITOR

**Q**uadram Corporation's new high-resolution, 17-inch monochrome monitor, QuadScreen, is designed for use with the IBM Personal Computer.



Quadram's monitor for the IBM Personal Computer, QuadScreen, displays 160 characters by 64 lines on a 17-inch screen.

In the text mode, character configuration is 160 characters by 64 lines. This allows the display of 10,240 characters at one time. The user can change the number of columns to any amount between 40 and 160. If the 80-character by 24-line mode is chosen, characters are four times the size they would normally be on a 10-inch screen.

For each text application, every dot on the screen can be individually addressed. Bit-mapped graphics allow dot-addressable resolution of 960 horizontal by 512 vertical. And QuadScreen's hardware can display any character font in any size.

QuadScreen has full IBM PC-DOS/BIOS compatibility with added commands for character set determination. Other features include reverse video and forward/backward smooth scroll.

QuadScreen's display controller card has 64k memory which can be used for computer memory expansion. In its ROM, QuadScreen has its own character set as well as driver firmware.

This monitor is available with a standard P4 phosphor, high-resolution monochrome screen, or an optional P39 green phosphor display. The controller board fills one slot on the computer and the software included with QuadScreen can configure characters of any size or shape.

**FOR MORE INFORMATION:** QUADRAM CORPORATION, 4357 Park Dr., Norcross, GA 30093; (404) 923-6666.

### A SOUND BASIS FOR LEARNING

**S**cott Instruments has introduced what the company claims is the first personal-computer-based instructional tool that uses speech-recognition technology. The VBLS (voice-based learning system) allows students to talk to their computer, controlling the computer and the pace of teacher-authored lessons by voice.

The VBLS system can be used to instruct students from the first grade to their fourth year of college. Teachers determine the content of each lesson, fix the mode of presentation, and determine the means of evaluation. This system requires no programming skills. Teachers enter

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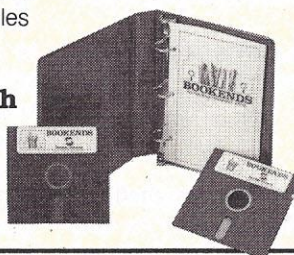
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## HARDWARE OF THE MONTH

lessons vocally and by keyboard in the language of the student. To write a lesson, the instructor types each question and its answer into the computer and then each answer is spoken into the microphone. The VBLS system "learns" the author's voice patterns which serve as a model for the learner's responses. The VBLS system can understand any language, including utterances resulting from speech impediments.

Not designed solely for schools, the VBLS has applications in training departments as well. The VBLS system can support many HRD training needs, including orientation, job skills, safety training, supervisory training, technical training, and management development.

The training programs are trainer-authored, but no programming skills are needed to write them. Quality and content of training materials are in the hands of the trainer. VBLS provides the trainer with a systematic format for developing training lessons.

The system's voice-entry terminal, the VET-2, is a speech-recognition device consisting of a hardware pre-processor and a software driving routine. Software resides in the host computer—an Apple II with 48k RAM. The software provides all functions for training and recognition. Vocabulary "words" may be up to 1.5 seconds and 20 characters long. Template area for a 40-word resident vocabulary requires about 4600 bytes and the control software needs approximately 6000 bytes. Therefore, a total of 10.6k memory is needed in the host computer for the control software.

The VBLS system includes functions for saving vocabulary sets to disk, calling up those sets, and selecting subvocabularies. These functions can be used interactively in the VET-2 or accessed from BASIC or machine-language programs. The user can access the training mode at any time, without losing the resident program, for updating single vocabulary entries or re-training the entire vocabulary.

The process of tutoring with the VBLS system involves display of the question and a request that the correct answer be spoken. When the learner completes the prescribed drill, the VBLS system proceeds to a review. The review can vary according to the instructor's needs. Performance histories are maintained by the system.

The Apple-compatible VBLS system costs \$895 including a VET-2 voice-entry terminal, VBLS software, and a reference manual.

**FOR MORE INFORMATION:** SCOTT INSTRUMENTS, 1111 Willow Springs Drive, Denton, TX 76201; (817) 387-9514.

### 1200 BPS MODEM AVAILABLE FOR APPLE II AND APPLE II PLUS

**M**ulti-Tech Systems's Multi-Modem II is designed for use with the Apple II, Apple II Plus, Apple //e, and Apple look-alikes such as the Franklin 1200, and Bell and

Howell computers. The new modem provides full or half duplex, and 110, 300, or 1200 bits-per-second communication over standard dial-up telephone lines.

The Multi-Modem II features user prompts at all levels of command entry and has auto-dial, auto-answer, and keyboard dialing. Using the software voice/data switch, you can manually answer or originate transmissions. It is also software compatible with other Apple II smart modems.

The modem does not require the use of a serial interface card; you simply plug it into one of the I/O slots inside the Apple computer. The firmware of the Multi-



The Multi-Modem II from Multi-Tech lets your Apple communicate at 1200 bits per second over standard phone lines.

Modem II also allows the computer to function alternately as a terminal or a computer while under program control.

The Multi-Modem II offers crystal-controlled, digital transmission, and reception of data to other Bell 103- and 212-compatible equipment. With LEDs on the front of the modem to check transmission status, you can diagnose problems involving analog loop and remote digital loop.

The Multi-Modem II retails at \$749, including software.

**FOR MORE INFORMATION:** MULTI-TECH SYSTEMS, 82 Second Avenue SE, New Brighton, MN 55112; (612) 631-3550.

### OPTICAL MOUSE FROM USI TO AID GRAPHICS USERS

**T**he OptoMouse from USI is an optical mouse for CAD/CAM and graphics systems users. It's designed to replace traditional cursor manipulators such as joysticks and lightpens. This device also aims to replace traditional electromechanical mice, whose wheels or ball bearings can get dirty and refuse to roll.

USI's OptoMouse has a custom optical imaging system in place of the mechanical components of traditional mice. The OptoMouse is a small box with two rocker switches. It rolls on the X and Y axes on a flat surface,

communicating its movement to the computer and interface by a tail-like cord. Smaller than a deck of cards, the OptoMouse requires 5 volts of power from the host system.

The user moves the OptoMouse over a special pad with a grid pattern. The pad detects the motion of the mouse and translates it to the CRT screen.

Priced at \$300 in single quantity, the OptoMouse is also available at discounts in large volume deliveries.

**FOR MORE INFORMATION:** USI INTERNATIONAL, 71 Park Lane, Brisbane, CA 94005; (415) 468-4900.

### **SPECTRA VIDEO'S ENTRY INTO THE \$300-RANGE MARKET**

**T**he Spectravideo SV-318 from Spectra Video carries a base price of \$299.95, and is backed up with 14 hardware peripherals and over 100 software programs.

The SV-318 has a Z80A CPU. It features 32k ROM expandable to 96k, and 32k RAM expandable to 144k. An extended Microsoft BASIC interpreter program is

also built in, as is 80-column 2.2 CP/M and CP/M Plus compatibility.

An ergonomically designed keyboard features 71 keys, 52 graphics symbols, 10 user-definable functions, 16 separate colors addressable from the keyboard, and upper- and lowercase alphabet. It also has a joystick, separate game cartridge slot, and high resolution graphics.

Composite video and audio output is provided for a TV modulator. A display output of 24 lines and 32 dot-matrix characters per line is seen with each row giving a different foreground and background color. The audio provides three sound channels at eight octaves per channel.

Some of the peripheral devices available now include: the SV-903 dual channel/stereo data cassette drive; SV-601 seven slot super expander; SV-901 dot-matrix printer; SV-701 dual baud rate modem; SV-105 sensor-touch graphic tablet; and the SV-806 80-column display card.

**FOR MORE INFORMATION:** SPECTRA VIDEO, INC., 39 West 37th St., New York, NY 10018; (212) 869-7911. 

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Ask your computer dealer about VC-Expand and the Saturn RAM boards. See how much bigger and better your VisiCalc models can become.

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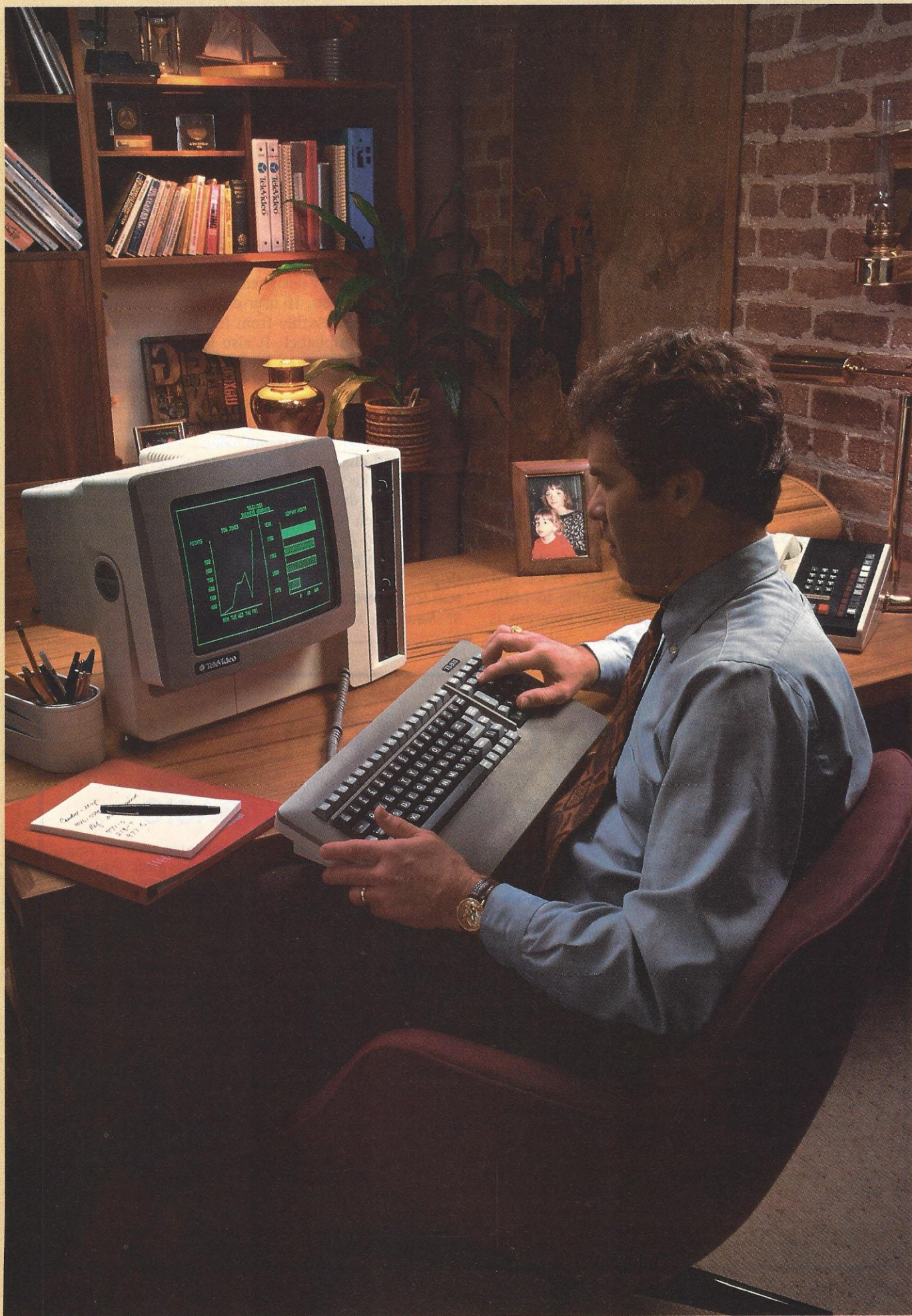
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CIRCLE 78

## Streamline Business Management With New Software Packages

*Each month Personal Computing scans the software market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in the index.*

### ADVANCED WORD PROCESSING FOR THE IBM PERSONAL COMPUTER

Looking for the middleweight champion word-processing program? Well, VisiCorp just announced a real contender: VisiWord. Running on the IBM Personal Computer now (and other machines in the future), VisiWord is designed for professionals who write as part of their work. Such people don't have time to memorize 100 commands, or dog-ear the manual relearning the program after a week's respite. Yet they need real writing power—a "memo processor" won't do. The right program must weave numerous heavy-duty features into a simple, user-gentle format; and VisiWord achieves this rare mix.

VisiWord's success comes from harnessing the power of large memory. It requires 128k of RAM—twice what most programs require. VisiWord fills this RAM with features like: smoothly integrated HELP functions for every phase of operation, spooling with two-drive systems, the ability to use up to 512k of RAM for editing novelette-size files, the ability to view and edit two different sections of a file—or two different files, including VisiCalc files—at the same time, and the ability to get maximum use from the IBM's versatile keyboard.

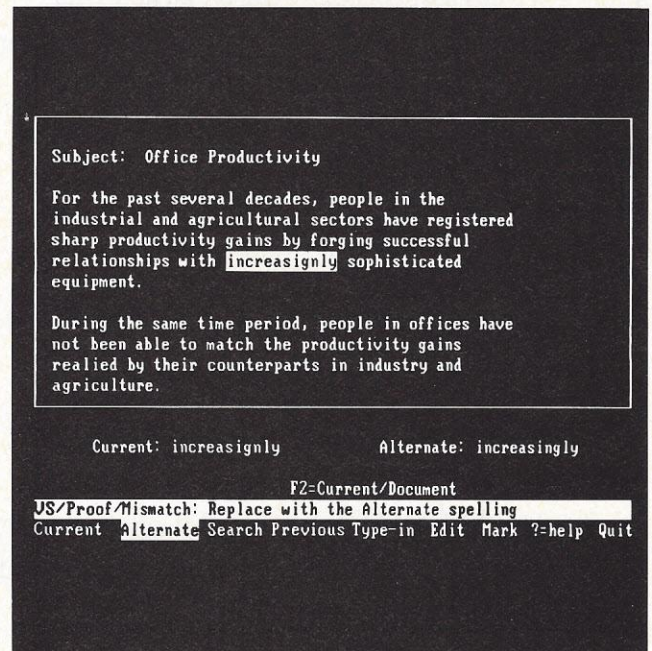
The ability to take advantage of the keyboard becomes evident when you first use VisiWord. You just snap a labeled overlay around the IBM keyboard's 10 programmable function keys. With the labeling, there's no need to memorize commands before using the program. Labeled commands include actions like AGAIN, or re-execute last command; DELETE LINE; and UNDELETE.

To start up VisiWord, boot the DOS diskette. Then swap in the VisiWord diskette and type "vw." The first screen display explains how to move the cursor, choose a function, or get help. Selecting HELP brings up an auxiliary display that describes the basic command structure. If you don't need HELP, hit RETURN or ENTER on the IBM, to go to the edit screen where you can write and revise text.

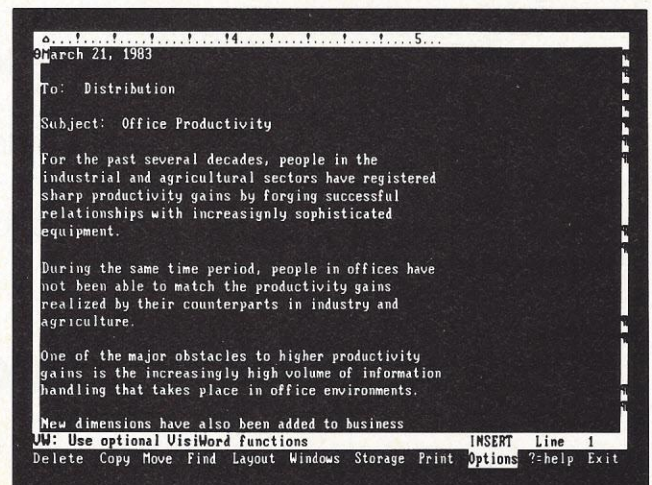
The edit screen provides a "what you see is what you print" format, making it easy to use VisiWord. To avoid

repetitive maneuvers like arranging headers and page numbers, VisiWord can be set up to do such things automatically.

A frame containing status information surrounds the edit screen, like the ruler across the top with a moving



The VisiWord word-processing program from VisiCorp combines numerous heavy-duty features with an easy-to-use format.



type position pointer. The sides of the frame include codes for special characters the display can't show directly, like underlining. The bottom of the frame reveals a row of 11 one-word commands and a one-sentence prompt line that describes the currently selected command function. When you first enter the editing frame, the prompt line gives instructions on how to move from writing mode to command mode (a bit of information that often has users scurrying to the manual with other word processors).

VisiWord's command menu arrangement gives just as much information as a large menu, but leaves plenty of room for text. It also includes a life preserver—the 11th command is HELP! This brings the initial HELP display back on-screen, with its review of the program basics.

In addition to editing, other functions work equally smoothly. These include the printing mode and a mode that allows display, editing, and a combination of two different files—or different parts of one file—at once. VisiCalc files can be incorporated into text this way, and commands like "Column Copy" and "Column Move" make it easy to edit such files. It's also possible to engage system utilities like initializing storage disks or deleting files from them. With many word processors you have to leave the program to get into the computer's DOS. VisiWord can also work with very large files—up to the capacity of your computer's memory. This feature will be most useful when used in conjunction with a hard-disk storage device. Because the program is copy-protected, it can't be mounted on a hard disk, but files can be stored there.

VisiWord has enough power to let you edit a novelette, and is easy enough to use to dash off a note. This versatility took considerable development work by VisiCorp, and the product—like the IBM Personal Computer—is not inexpensive. VisiWord costs \$375, plus \$225 for a 100,000-word spelling checker. The package includes one program disk. Backup disks (you can't make your own) cost \$10 each. For a considerable outlay you get a considerable program—one that may well be the middleweight champion of the word-processor market.

**FOR MORE INFORMATION:** VISICORP, 2895 Zanker Rd., San Jose, CA 95134; (408) 946-9000.

—Lee Thé, Associate Editor

## INSTANTLY MANAGE COMPUTERIZED CARD FILES

**I**nstant Recall, a file-management program from Howard W. Sams & Co., provides a simple and useful way to create and manage computerized card files. In an hour, a computing novice can feel comfortable with the program's three modes—COMMAND, SEARCH, and TEXT ENTRY. In less than a day, that user can master the program's 45 commands. Instant Recall lives up to its name—it performs most of its functions in less time than

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CIRCLE 79

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it would take you to inhale a few deep breaths.

This program requires an Apple II Plus or an Apple //e with at least 48k of RAM and one disk drive.

Instant Recall's individual records hold about the same amount of information as a 5- by 7-inch file card. Each record can accommodate one 40-column screen full of data, or approximately 140 words. Files can hold from 34 to 100 of these records, and each disk can hold four files. The program can handle one or two data disks at any one time, for unified access to a maximum of 229,000 bytes of data—roughly 38,000 words.

The package includes the program disk, a data disk with two sample files on it, the user's manual, and a quick reference card. When you first try out the program you open the manual to the 2½-page "quick start" section, put the program disk in your drive, and turn on the computer. After the boot, you are told to put the supplied data disk in the drive, get a file, then search through it for records containing both the words "Apple" and "micro." Records containing the key words are displayed one by one, with the key words in inverse video. In just a few moments you've successfully used the program, and you're ready for the 14-page tutorial that will give you mastery of Instant Recall's functions.

The 23-page Reference/Index section that follows the tutorial describes each command in detail. The manual gives exceptionally clear instructions on how to use the program. For example, every keystroke you make is printed in red, and screen photos show the results of hitting a particular key. The manual even tells you how to reconfigure the program if your printer interface isn't in slot 1.

Booting the program puts you in the COMMAND mode, which has 15 commands that allow you to load a file into memory, initialize blank diskettes, erase files on disk, and catalog disks. The disk catalog features three-line descriptions of each file, as well as the file names.

One-key commands take you into either the TEXT ENTRY or SEARCH modes. If you go into TEXT ENTRY mode you find a modest—but sufficient—word processor. You work in all uppercase, but you can employ word wrap, in which the program automatically places the word you're writing on the next line if there isn't room for the whole word at the end of a line. Once you've entered text, you can use the cursor-control keys to move over the record quickly. You can then insert and delete characters and lines, print records, and so forth.

After you've filled in your record, you save it and start to build a file. When you have several records saved you can search by an alphanumeric string or by the number the program assigns to each record. You can revise, delete, renumber and print records at will.

Instant Recall is only a card filer, but it works with efficiency and aplomb. Even an advanced computerist

could find this \$60 program a handy adjunct to his \$300 to \$1500 data-base program.

**FOR MORE INFORMATION:** HOWARD W. SAMS & CO., 4300 West 62nd St., P.O. Box 7092, Indianapolis, IN 46206; (317)298-5566.

### **SEVEN MODULE ACCOUNTING AND MIS PACKAGE FOR IBM**

**S**oftware Libraries Incorporated has introduced the Business Library Accounting and Management System, a seven-module business accounting and management information system for the IBM Personal Computer. According to Software Libraries president Bruce A. Schooley, the package stresses advanced software capability.

Written to the general specifications of a Big Eight accounting firm, the system includes basic modules for accounting—general ledger, accounts receivable, accounts payable, and payroll. More specialized modules—inventory control, sales order entry, and purchase order tracking—allow the user to refine the system.

Modules can be used independently or integrated into the entire system. Average price of the modules is \$595.

Software Libraries says general ledger is suitable for multiple-company organizations and provides independent and group financial records. All necessary financial statements are provided with virtual no-limit journal and report creation.

Accounts receivable manages receivables for wholesale, retail, and general business operations. It computes interest charges, prints billing statements, and shows the status of outstanding accounts, individual customer credit, and incoming cash.

Accounts payable is designed for distribution, manufacturing, and general business activity. It creates and maintains a vendor master file, records invoices, develops payment schedules, prints checks, reconciles bank accounts, and updates the general ledger.

Payroll produces tax summaries for departments, and quarterly state and federal tax reports. It manages all types of payrolls, deductions, periods, and earning bases.

Sales order entry tracks the progress of orders from initiation through shipment and provides a variety of reports for complete sales analysis.

The inventory control system monitors single or multiple warehouse locations, keeping track of items to the bin level. Inventory balances and price structures are monitored in relation to demand.

Purchase orders for multiple companies can be maintained with the purchase order tracking system, which will also accept requisition information from inventory control and print purchase orders.

**FOR MORE INFORMATION:** SOFTWARE LIBRARIES INCORPORATED, P.O. Box 844, Pasadena, CA 91102; (213) 793-1700.

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## SOFTWARE OF THE MONTH

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### DATA BASE MANAGEMENT FOR NON-PROGRAMMERS

**M**any data-base management systems require some sort of programming for efficient use, but this isn't true of InfoStar, according to the program's publisher, MicroPro. Instead, on-screen menus written in English guide the user through each step of the program's operation. Four levels of help menus are provided to assist both the novice and the sophisticate.

Users enter data through on-screen forms that are "drawn" with a cursor. Data are output from the program through the report generator, which lets users tailor information to meet specific needs. Reports can be edited to change column headlines, move fields, and insert dollar signs and decimal points. The program can sort records on as many as 32 key fields, giving it the power to sort up to 560 records per minute.

InfoStar can be used with either dot-matrix or letter-quality printers. It requires CP/M 2.2 or a later version, and at least 48k of memory. Its suggested retail price is \$495.

**FOR MORE INFORMATION:** MICROPRO INTERNATIONAL CORP., 33 San Pablo Ave., San Rafael, CA 94903; (415) 499-1200.

### TWO TYPING TEACHERS

**T**yping Strategy from Behavioral Engineering is designed to teach the typing habits of master typists. When the program is running, the user sees a keyboard and a pair of hands on the screen. Through color graphics and sound, the user associates the character to be typed with its position on the keyboard and with the finger to be used. If the user hits the wrong key, that key is highlighted on the display to show its relationship to the right one. That way, the student never has to look at his hands or at the keyboard, only at the screen. Its immediate visual feedback has the net result of building good habits right from the start.

At the beginning level, students learn finger-key-character relationships through sound and sight prompting. Then they may move to game or non-game typing practice. Later, typing tests aim at improving speed and proficiency. The user can also introduce specialized words or phrases, such as medical or legal terminology, into the practice routine.

Letter Man, based on the Pac Man arcade game, is a Behavioral Engineering computer game that teaches typing and increases speed through play. The user controls Letter Man, who is caught in a maze filled with words, letters, and numbers. Letter Man is chased by Gobblers, whose starting speed in wpm the player sets before play begins. The player must then type the character adjacent to Letter Man in the direction he wishes to go, in an effort

to get through the maze of characters without being gobbled up.

These programs are available for the Apple II, the IBM Personal Computer, the Commodore VIC-20, and the Commodore 64. Letter Man and Typing Strategy are sold separately; each costs \$29.95 (\$24.95 for the VIC-20).

**FOR MORE INFORMATION:** BEHAVIORAL ENGINEERING, 230 Mt. Hermon Road, Suite 207, Scotts Valley, CA 95066; (408) 438-5649.

### PRESENTATION-QUALITY GRAPHICS

**A**s new hardware adds a plethora of functions to personal computers, appropriate software has to be developed to take full advantage of these capabilities. To address this need, Graphic Communications has introduced its new Graphwriter package for the IBM Personal Computer. Company spokesmen say the Graphwriter will set the standard for such packages.

Graphwriter uses an inexpensive pen plotter like the Hewlett-Packard 7470A. Graphic Communications claims the system will provide capabilities similar to those available through suitably equipped mainframe systems, but at an incremental cost of less than \$2200 per personal computer. Mainframe-based graphics systems cost several thousand dollars for the graphics terminal alone, to say nothing of the additional cost of hard-copy output devices, software, and, of course, the cost of the mainframe itself.

There are those personal-computer graphics packages that offer limited options, and such is their fate. Graphwriter attempts to solve this problem by offering a variety of formats coupled with the flexibility to modify each format. According to the company, a user can produce the chart he wants the way he wants it. Inexperienced producers can choose from a catalog of over 40 formats, including pie charts, bar charts, line charts, organization charts, Gantt charts, bubble charts, and the like.

Graphwriter is sold with two format sets—basic and extension. Each costs \$395; together they cost \$750.

**FOR MORE INFORMATION:** GRAPHIC COMMUNICATIONS, 200 Fifth Ave., Waltham, MA 02250; (617) 890-8778.

### WORD PROCESSOR WITH SPELLING CHECKER

**D**istributed Software Systems' newest entry into the market is a word processor called Quick-Text, which, the company claims, has the features and performance of word processors costing four times as much. The program works with either Quick-Text documents or standard DOS files.

Editing functions include word wrap, right justification, block and line move/copy/delete, character insert and delete, centering, text insert, file merge and create,

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## SOFTWARE OF THE MONTH

search and replace, tabs, and text reformat. A status line and ghost cursor allow uncomplicated input of tabular data.

One special feature of this package is the spelling verify function, which allows the user to check the spelling of words as they are entered. To check spelling the user places the cursor anywhere on the word and presses a function key. The built-in dictionary of 1000 most frequently misspelled words is expandable.

The Quick-Text package requires systems using PC-DOS, and having 64k or more of memory. Its price, \$55, includes floppy disk and user manual.

**FOR MORE INFORMATION:** DISTRIBUTED SOFTWARE SYSTEMS, P.O. Box 1301, Northbrook, IL 60062; (312) 634-1511.

### ADD AN EXTRA VISUAL DIMENSION TO YOUR IBM

**F**or those a tad hesitant about using computers, Kennen Publishing of Mill Valley, Calif. has produced a video

training tape entitled "How To Use Your IBM PC in 10 Easy Video Lessons." The tape—distributed by Stoneware, Inc. of San Rafael, Calif.—leads the novice computer user through approximately four hours of practical computer knowledge and training.

The combination of video and the computer provides the user with simulated one-to-one instruction. The tape shows an operator at an IBM Personal Computer and suggests a specific exercise for the viewer. The VCR monitor then reflects what the user's own IBM screen should display. Visual signs and beeps indicate optional pauses that allow the user to progress at his own pace.

The video, designed for the image-oriented, provides all the instruction necessary to make immediate use of the IBM system. Cartoon characters make technical jargon more understandable, and the narrator is consistently reassuring: "Don't be afraid to press the keys. There is nothing you can do from the keyboard that will cause any major problems. The worst that can happen is that you'll have to start a program over."

The tape consists of 10 chapters, which include how to assemble the IBM system, hardware and software explanations, keyboard functions, and how to write short programs. Especially important for first-time users will be Chapter Six, a step-by-step guide to formatting a blank diskette and making a copy of DOS.

While not designed to replace operation manuals, the tape does add extra visual dimension to both manual instructions and simple applications.

The price for "10 Easy Video Lessons" is \$120. Considering the price of computer seminars, it's a reasonable rate for four hours of instruction. Since it's a tutorial that can be repeated, it ensures the user full benefit of the lessons provided. Similar video training tapes are available for the Apple II and ///.

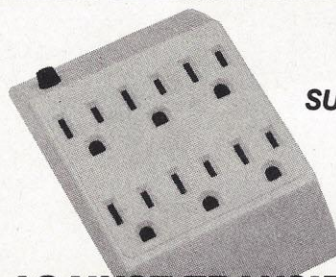
**FOR MORE INFORMATION:** KENNEN PUBLISHING, 150 Shoreline Hwy., Bldg. D, Mill Valley, CA 94941; (415) 332-5825.

### MAKE MUSIC WITH YOUR COLOR COMPUTER

**S**YNTH7, a machine-language program, turns the TRS-80 Color Computer with a 16k or greater memory into a musical instrument. When the program is running, the upper two rows on the keyboard act like the keys on any keyboard instrument—the upper row produces sharps and flats, like black keys, while the second row produces the naturals. The sound of the notes can be changed by adjusting the attack, sustain, decay, or release of the note.

Five different "stop" waveforms can be set, each with a range of several octaves. Below this range many "electronic" timbres can be played, including game sounds, trills, tweedles, and bleats.

The system outputs the notes through the monitor but



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you can also divert output to a sound system. If you do that, the publisher recommends equalization because of the large amount of high-frequency sound in the output.

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The critical factor in this procedure is to allow the ink to soak in and equalize along the length of the ribbon for at least 24 hours. If you use the cartridge too soon, the letters will be filled in, or blotchy.

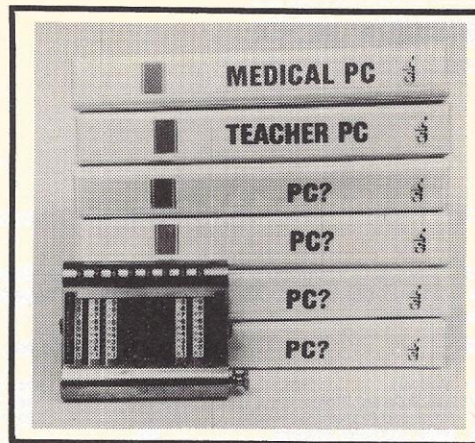
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Arthur C. Matthews  
MENOMONIE, WI

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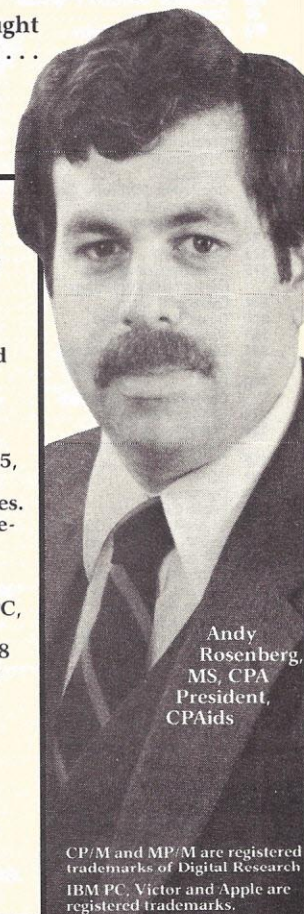
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CIRCLE 84

April 1983 PERSONAL COMPUTING 191

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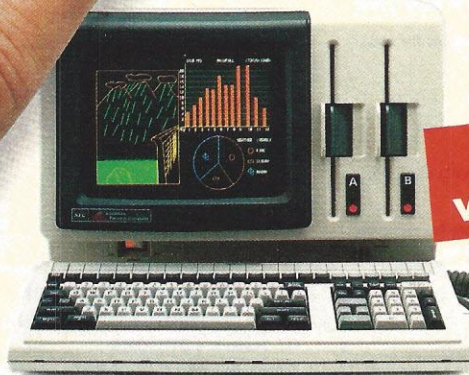
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3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REGWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPFOT	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQOQOQ	Fixed quantity economic order quantity model
53	FQOQOWSH	As above but with shortages permitted
54	FQOQOQPB	As above but with quantity price breaks
55	QUEUECB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project

59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
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76	BUSBUD	DOE business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
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## Some Thoughts On Well-Structured Programs

Jeffrey Bairstow's review of *A BASIC Programmer's Guide to Pascal*, on page 153 of the February 1983 issue, was well done and appropriate. However, I take exception to some of his thoughts on structured programming.

Structured programming is an attribute of program writing, not of a language. While it is rather difficult to write an unstructured program in Pascal because of the way the language was originated, it can be done. In addition, structured programming is the correct way to write programs in FORTRAN, BASIC, COBOL, or any other language. It is easier to write sloppy programs in BASIC and get them to work, but that simplicity does not make it correct or even desirable.

I have seen some rather disorganized commercial software on which I wanted to do some modification. I gave up because I could not, or did not want to take the time to decipher the mess. Maybe it was done that way to inhibit making unauthorized copies or trying to transfer the program to another computer. Contrary to that example, a well-structured program can easily be read and understood five years from now, or read and understood by another person with no help

from the author. I see that as an indication of competence.

Byron D. Jones  
ELKO, NV

### CREATING THE PERFECT VISUAL MESSAGE—IN COLOR

I thoroughly enjoyed your February 1983 issue; there wasn't a single article I didn't find informative. I would like, however, to point out a few things that seem to have escaped the attention of two of your authors.

First, in the article "Computer Graphics: The Perfect Visual Message" on page 96, David Gabel notes that while it might be nice to be able to produce graphics in color, "...there isn't a really low-cost, hard-copy, color-output solution yet." He seems to be unaware of Integral Data Systems's Prism Printer, which for about \$1700 produces hard-copy, color output using a four-color ribbon.

Second, in his review of the book *TRS-80 Data Communication Systems* on page 161, Jeffrey Bairstow writes, "...my most serious criticism of the book is that the author didn't take the time to expand his material to cover a wider audience." Bairstow might be interested to learn that Frank Derfler Jr. first wrote a book called *Microcomputer Data Communication Systems*, which presents material applicable to many different systems. The book Bairstow reviewed is a later work that applies the same concepts to only one system. If he was looking for a general introduction, it would appear that he reviewed the wrong book.

John D. Toppins  
LAWRENCE, KS

### AN EDUCATIONAL ALTERNATIVE

We were quite pleased to see your treatise on the subject of the growth of computer camps in the February 1983 issue of *Personal Computing* ("Camping and

Computers—An Educational Alternative," page 126). Youngsters now have an opportunity to plan meaningful summer vacations with the proliferation of camps all over the country.

Your readers might be interested to know that Anthony Schools also offers an intensified day-camp series throughout the summer at several of its 27 locations in California. The programs are scheduled on a weekly basis and run from 9 a.m. to 5 p.m. Although students have the opportunity to participate in light recreational activities, the majority of the day is spent hands-on, in classrooms filled with Apple computers. The curriculum for the one-week day-camp program, because of its concentrated nature is the same as that provided for its two-week residence camps through Sports-world Inc., but the cost is substantially lower.

William A. Ims Jr.  
VICE PRESIDENT  
ANTHONY SCHOOLS OF SAN DIEGO  
SAN DIEGO, CA 92108

I read with interest your article "Camping and Computers—An Educational Alternative" (February 1983, page 126).

This letter is to acquaint you with a computer camp which will be held this summer in Austin, Texas at St. Stephen's Episcopal School. The unusual feature of this camp lies in its class structure. Students will be placed according to prior knowledge and experience—not age. Also, the camp is not restricted to any particular age group. Adults from 19 to 94 may attend the camp on a day-student basis. Boarding students will range in age from 12 to 18.

By mixing the age groups we hope to create a stimulating atmosphere. This type of class structure takes into account the new situation in which educators find themselves when confronted with the

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

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## LETTERS

"computer revolution." We anticipate that the adults will learn more from the younger students than the reverse. We also hope that such an arrangement will help to erase some of the distance between those of different generations.

Jim S. Halsey  
AUSTIN, TX

We have received several requests from readers to give more information on how to contact the two camps mentioned in the article. Their addresses are as follows: Atari Computer Camps, Dept. PC, 40 E. 34th St., New York, N.Y. 10016, (212) 889-5200; National Computer Camp, Box 624R, Orange, Conn. 06477, (203) 795-3049.—The Editors

### APPLE'S LISA: THANKS BUT NO THANKS

LISA is a most remarkable piece of entry-level hardware. (See "A New Generation Arrives," February 1983, page 48.) Its impact on the novitiate level of middle managers will be considerable and important for that reason alone.

As I've made the voyage from File Cabinet to DB Master, the trade-off between ease of use and increased capabilities has become more sharply defined in my mind. Many of the ease of use functions that are already available, such as menus, become a hindrance as my skills increase and my needs become greater and more defined.

The mouse/icon marriage is, after all, only a menu with limited options. What was the trade-off in field, record, and spreadsheet size to gain this picture menu? Is the user stuck with this menu for the life of the machine? If so, I'll stick with my Apple II Plus/DB Master and let the beginners go with LISA!

Elton C. O'Byrne  
JACKSONVILLE, NC

### ADDITIONS

The price of the Model 1010 hard disk drive from Cameo Electronics, Inc., mentioned on page 88 of the January 1983 issue, is \$5995. In addition, the Model 2010 and its second drive can only be backed up with floppy disks.

The two center graphs on page 98 of the February 1983 issue were prepared by Decisions Resources, Inc. of Westport, Conn., using the Chart Master software package.

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**Infinite BUSINESS** Mod I and III \$30 (Requires Infinite BASIC) Printer pagination controls, binary array search, and more!!

**Command Process 'COMPROC'** Mod I and Mod III \$30 Auto your disk to perform any sequence of keyboard instructions.

**Diskette Catalog System 'DISCAT'** Mod I and III NEWDOS 80 Version 2 \$50

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CIRCLE 61

April 1983 PERSONAL COMPUTING 197

# The reason you bought a computer in the first place.

## The Agony... You expected

your new computer to perform miracles — to bring order out of chaos. You looked for it to organize and manage your business information. You looked forward to the end of errors, the end of frustration . . . and the saving of time, effort and money. After all, that's the reason you invested in a computer in the first place. Yet, there it sits. Nothing

## ...and the ecstasy.

Well, your computer *can* perform all the miracles you hoped for. It needs just one professional addition. **The General Manager.**

The General Manager is what the computer industry calls a data base management program (DBM). In everyday words — it allows you to organize, store, file, find, save, retrieve, interrelate, control and print out all or selected parts of your information. The result: your information, or data, is managed totally, completely, automatically.

## Ordinary

The ordinary DBM system expects your business to conform to its program design. So you must change your records, your forms, your way of having information cross-referenced, saved and . . . well, you almost end up with a different business! Certainly a more frustrating one.

## Extraordinary

The General Manager on the other hand is extraordinary in the DBM field, because it makes no such demands on you. Instead, it lets you make demands on it! The General Manager was designed so that your business

routines can be kept as individualized as you want . . . so your data is managed and delivered in the ways which are most useful, efficient and effective for you.

It works so easily and so well because of its "hierarchical" structure. This sensible "family tree" type of design starts

with the main subject, then branches out to related information. You enter data on "Blank Forms" which you may construct to your exact needs. The data may be updated, deleted or modified to your heart's content. To know The General Manager will be to love it!

## Power & Price

Nothing near the price of the General Manager (by hundreds of dollars) gives you all the power, features and benefits it does! At \$229.95, The General Manager is the absolute value in its field.

Consider this: it supports 1 to 4 floppy disk drives (even hard-disk systems). It includes utility programs which others charge hundreds extra for. Upper and lower case characters in the data base are provided without need for additional costly hardware. If someone goofs, the "error message" is displayed in understandable English. There is an on-screen "Help" function available any time. It creates Applesoft usable files for your program needs. And many especially useful printing commands are built-in

for greater flexibility. When you consider all these advantages, and more, we think your business sense will agree, there's no contest at any price.

## The fantasy...

Almost everyone claims user friendly documentation. The fact remains much of it is convoluted, complicated and defies under-

standing. You can't afford that! — for a program without excellent documentation is frustrating and basically useless.

## ...and reality!

At Sierra On-Line we've spent the time and the effort to create superb documentation. It is so good that you can have The General Manager up and running after the first two chapters! And after you're thoroughly at home with it, you can move on to the other chapters as you have need for the many additional functions and capabilities.

## The reason you bought...

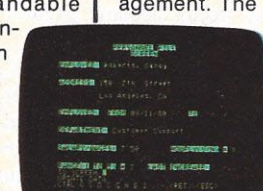
. . . a computer in the first place was, we know, twofold: for word processing (our Screen Writer program is the leader) . . . but mainly for information management. The General Manager is your powerful answer . . . the truly outstanding value in DBM's, bar none, at only \$229.95.

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\*The General Manager, version 2.0 requires 48K Apple II or II+, 1 or more drives, DOS 3.3. Direct orders add \$3.00 shipping/handling.



## John Cavalier Speaks Out On The Home Computer Market And The Shape Of Its Future

**A**tari, Inc. was founded in 1972 by Nolan Bushnell, inventor of the video computer game Pong, which changed the nature of amusement arcades forever. The name Atari comes from the strategy game Go, and signals impending victory for one player. In the late 1970s and early 1980s that battle cry aptly described Atari's video-game presence, as nearly 10,000 employees produced 80 kinds of arcade games for markets in more than 40 countries. In the home game arena, Atari was the leader in an industry that was out-grossing both records and movies.

In late 1979, Atari entered the home computer field with its models 400 and 800. This made an interesting product mix for Atari, since many observers feel that home computers will spell the demise of the less versatile video-game units. Atari's home video-game division did poorly in late 1982, and actually caused something of a financial scandal when its earnings were announced. The computer division, however, forges onward, most recently introducing the 1200XL, a sleekly styled home computer with 64k of memory. In addition, Atari's research side has recently grown with the addition of two very big names in computer research: Alan Kay, whose work at Xerox laid the foundation for the latest generation of friendly LISA-type software; and Ted Hoff, who at Intel was credited with inventing the microprocessor itself—the chip that started it all.

John C. Cavalier, president of Atari's home computer division, reflects a new trend in the management of computer companies: aggressive recruitment of individuals from the "outside world." The outside world,

in this case, means soap companies or record distributors or pizza chains—anything but computers. For marketing positions in this field, it's no longer necessary that one remember when the first micro-computer appeared on the cover of Popular Electronics.

Cavalier is clearly a product of this trend: Before joining Atari in August of last year, the affable 43-year-old spent 13 years in various management positions at American

Can Company. His most recent position there was vice president of the unit producing Dixie cups. The skills Cavalier brought to Atari were in the marketing of consumer goods, and it is from that perspective—and with considerable enthusiasm—that Cavalier talked to Personal Computing about the state of the home computer market and its future.

### What is the home computer?

**Cavalier:** It's a tool which will revolutionize everything in the home—from learning and entertainment, to controlling and monitoring your heating and cooling systems. Our judgment is that it's a resource like television was 25 years ago. TV revolutionized life at home and the home computer will do the same—only it will be much more active than TV was. With television you could be entertained and not have to think a lot. The home computer is just the opposite—it puts your brain to work.

### How is the home computer different from the personal computer?

**Cavalier:** The personal computer is an extension of what's going on in the office. It allows someone to work at home, at night, but it's not designed specifically as a family entertainment center or learning tool, although it can be used for that. We made a very clear strategic decision—that the real revolution in computers would be when the cost came down and it became a product within reach of the masses. You don't have to have a huge income to afford a very powerful computer in your home today.

**Personal-computer buyers usually have one main reason for buying—VisiCalc, say, or word processing. Why do people buy home computers?**

**Cavalier:** It's evolving. The current

*"I think you're  
going to see a  
lot of women buying  
computers out of  
the grocery money."*



Photos by Carol A. Foote



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profile is the 25- to 49-year-old male—who's buying for three reasons. First, he's been exposed to computers in the office and it's a logical extension to get one for the home. Second, he's a hobbyist who is willing to try new things. And third, he's heard about computers from his children. And this third phenomenon is really starting to catch on. Kids come home from school and say, "We did this with the computer, we did that with the computer. Why can't we have one at home?" Parents think, "Why not?" and start to investigate. They know the applications at the office—now they're learning about the educational uses and, from video games, they understand the entertainment aspects. Finally the whole picture—business, school, and home environment—comes into focus.

**Will this market change?**

**Cavaller:** Yes. As I said, the traditional audience for the computer is the 25- to 49-year-old male. But I think you're going to see a lot of women buying computers out of their grocery money, as a tremendous educational tool and a way to help with their children's learning. The mother can sit down and have a very good relationship with her child through this device.

**Home computers are sold by mail order, in catalog showrooms, in stores that don't specialize in computers. Are there problems when a person gets it home and finds that it's a much more complicated product than, say, a television set?**

**Cavaller:** Well, it's a challenge—let me say that. The industry has to make sure people know what to do with the machines when they get them home.

The industry has to make the product as easy to use as possible. Look at the person who buys a new car. How many people read the instruction manual that comes with it? I bet if you looked at the research, you would see that only a very small percentage ever read that thing. That's typical of

the consumer—he doesn't want to have to deal with complicated things. If you can make it simple, then you can really open up the market.

**What impact will IBM have on the home market? It sounds like IBM's home machine will be in the price range of your 1200XL.**

**Cavaller:** I'd be foolish to underestimate IBM's ability to produce a product and bring it to market. But IBM didn't do anything spectacular with its personal computer—it took off-the-shelf technology, no proprietary chip sets, nothing. Rumors tell us IBM is doing the same thing for the home. Where we have an advantage, then, is that we understand the consumer better than IBM does. Not to say that IBM won't, at some point

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***"There are very few firms in Japan that have faced up to the software question."***

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in time, and so it'll be a strong competitor. But I believe the market is big enough for three or four very strong competitors. We have a tremendous brand image now. We're in the category of Coca-Cola, or Eastman Kodak. And we kind of grew up with the kids. None of our competitors did—TI didn't, IBM didn't.

**What about the Japanese in the home computer market? At the winter Consumer Electronics Show we saw Panasonic, NEC, and several others.**

**Cavaller:** As with IBM, I don't underestimate the Japanese. They build quality products, and quickly. But they've been rumored to be coming into the market for a long time, and I was frankly surprised by the lack of their presence at CES. The key issue with the Japanese is software—there are very few firms in Japan that have faced up to the software question. I think the way you'll see the Japanese coming in is in joint venture arrangements with large American companies. I believe that the Japanese have had a fundamental change in their strategy, and this is that they want to be manufacturers but not distributors. That's our best guess.

**Has Atari heard from Japanese firms along those lines?**

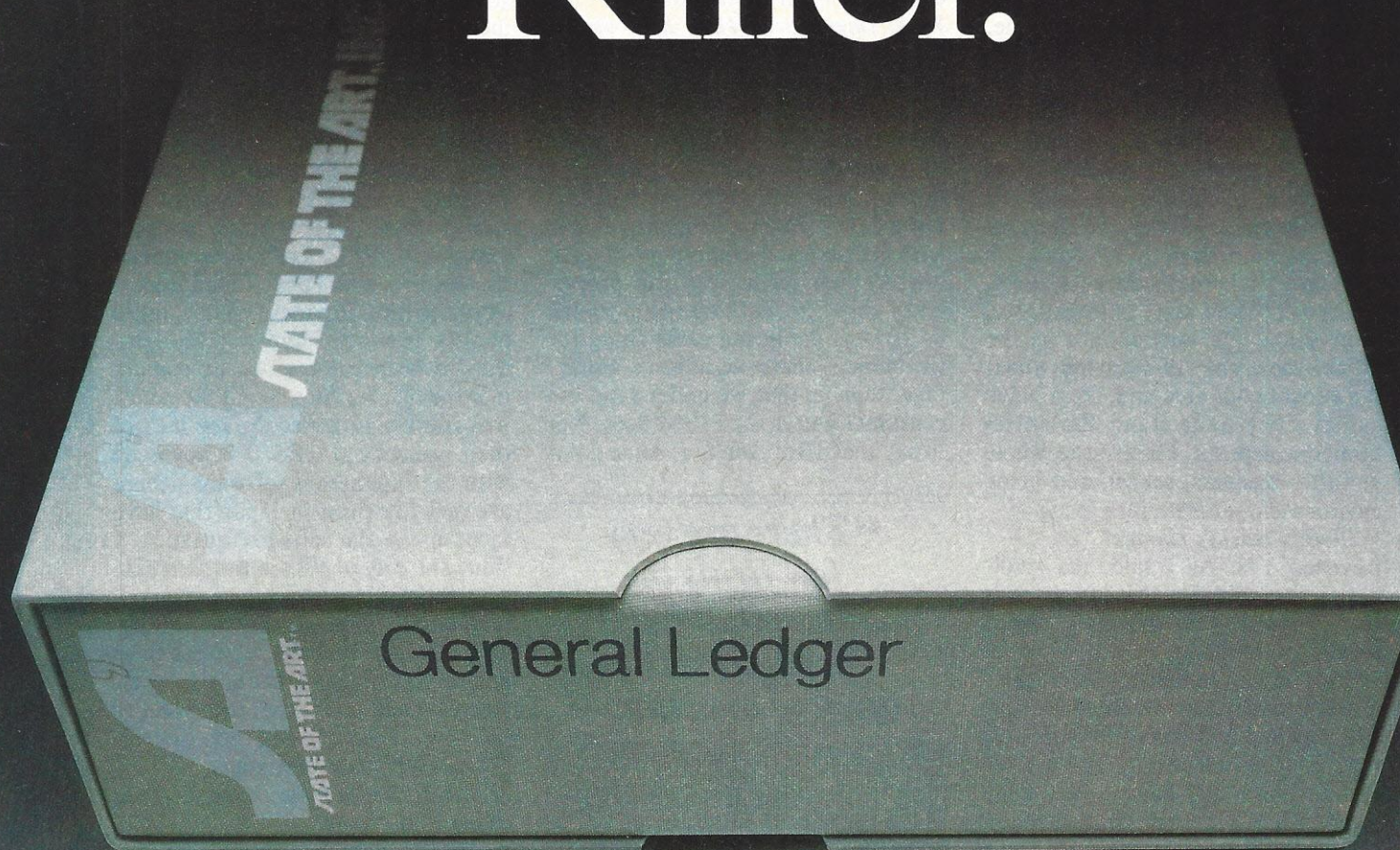
**Cavaller:** Atari has dealt with the Japanese on a lot of issues. The doors are open, both ways. They could be a very powerful force in the marketplace, if they figured out the right combination of things.

**What are people using home computers for now?**

**Cavaller:** Our statistics tell us that a high percentage of people now buy computers for an entertainment center. That will continue, but even that aspect will evolve—you'll see better graphics, more interesting capabilities. At the same time, though, people are going to become more computer literate. We're selling a lot of programmer kits for our computers.

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ther information and the name of the authorized dealer near you, write State of the Art, Inc., 3183-A Airway Avenue, Costa Mesa, CA 92626.



## The only standard in microcomputer software.

But it's selling very well, which leads us to believe that people are starting to have the ability to deal with complex programs.

*What about word processing in the home? Do you see the computer replacing the typewriter?*

**Cavaller:** I think it can, very easily. Shortly we'll be introducing a word-processing system, called Atari Writer, which we hope will do for the home computer what VisiCalc did for the business computer. It's a 16k cartridge with full word processing, and you can learn it in 15 minutes. It will operate with a variety of printers, as high quality as you want.

*Will Atari offer a correspondence-quality printer for the home?*

**Cavaller:** We'll be offering a whole series of printers in the future. There are many peripherals in the future.

*The 1200XL has an RGB output. Will you offer an RGB monitor?*

**Cavaller:** You'll see a lot of interesting things on our computers.

*You have some hot scientists on board now—Alan Kay, Ted Hoff. They're obviously not there to design the 1200XL. Can you talk a bit more about the "technologically innovative home computers" you've mentioned in speeches?*

**Cavaller:** It's difficult to talk about product concepts. All we really have in this business is lead time, and if I start talking about it, I could give that up. But you will be seeing new generations of very exciting multi-functional computers, under \$1000, in a relatively short period of time.

*What about software standards for the home? You mentioned there will be three or four strong competitors. Will there be three or four software standards?*

**Cavaller:** I think eventually software has to come together. It has to happen. I don't know when it will happen.

*Will the marketplace determine that?*

**Cavaller:** I don't know. It's so difficult to read. It probably will be a market-

place force. Both Apple and IBM did very smart things by opening up their software development to third party, cottage industries. It tends to force the market in their direction. A lot of people want to be IBM compatible right now.

*How about mass storage in the home? I read that Atari has lined up behind the 3 1/2-inch disk.*

**Cavaller:** No, I don't think that's decided yet. The quote you saw got out of hand; nobody here said that. There's an inherent problem with the 3 1/2-inch disk: cost. It's going to cost more than the 5 1/4-inch, and even though people are enthralled with it, it's not going to be a big seller until you bring the cost down.

*What will be used in the home? Cas-*

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**"You're going to have multiple computers in the home, by the late 1980s."**

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*ettes seem to be a stopgap measure.*

**Cavaller:** I believe you'll see lots of disk storage in the home. That will lead to products with built-in disk drives that allow you to manipulate disks very quickly. I'm not saying we're going to do that, but it makes a lot of sense.

*How about hard disks in the home?*

**Cavaller:** Well, we've talked to some hard-disk people who think that may in fact happen. But that's in two or three years—maybe 1985. It's not here now.

*Will ROM cartridges be the dominant form in which home software is sold?*

**Cavaller:** Yes. Initially—and it may go beyond the initial stage—there's a need for easy-to-use software, so the cartridge will be a dominant force in the home market. I think we recognized that, then Texas Instruments recognized it. TI would say it's the other way around. The cartridge will play a dominant role for a long time.

*Where will telecommunications fit in the home?*

**Cavaller:** It's going to be very important. We were kind of the pioneers of the banking-at-home concept, working with Chemical Bank on its Pronto project. At-home shopping is going to be very important in the mid- to late 1980s. Right now, there's not a delivery system that allows you to do that, from a mass standpoint. There will be.

*Did you consider building a modem into the 1200XL?*

**Cavaller:** It's a logical extension, yes. *Would you see that in the near term?*

**Cavaller:** It's not hard to do.

*What's the future of dedicated video games?*

**Cavaller:** I'm not going to answer any questions that deal with video games. It's outside my realm of responsibility.

*I would think that's a delicate question for Atari, since some analysts feel that home computers will entirely replace video games.*

**Cavaller:** Atari has said there will



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# EAGLE

## COMPUTER

*Above and beyond.*

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continue to be a market for dedicated video-game machines, and I believe those statistics. Look at the 5200—it's taking off. Research shows there's a large market of devoted game players out there.

*Where do you see computer entertainment headed, in terms of growth beyond the traditional arcade games?*

**Cavalier:** Those entertainment titles that have been successes in the arcades—every one has been a success in the home—are a perfect correlation. So I think arcade games being converted for home use will be a long-term phenomenon. And the new technologies—super graphics, 3-D—will only help that, once the prices come down.

*I'm also thinking of more sophisticated kinds of games.*

**Cavalier:** We'll see more adventure games and long strategy games. There are experiments going on now with large-screen games that involve 15 or 20 people. I think we'll see several players, linked together through telecommunications, playing games from off-site. There's going to be a whole range of entertainment that will keep evolving over the next few years.

*Prices of home computers are dropping very quickly. Where's the bottom?*

**Cavalier:** There's a lesson to be learned from the calculator and digital watch industries. Lots of people were in those businesses, and lots of people aren't anymore. In their attempt to gain market share, they forgot about profit at the bottom line. It's happening now, in computers. People are cutting costs to gain shelf space, and if they don't learn from the past, they're damned to repeat it. You can't do a hell of a lot with a computer with 5k of memory. I think you'll see prices coming down, but you'll also see people trading up.

*Is there a danger that people will buy the very inexpensive computers, find they can't do much, and be turned off to computers?*

**Cavalier:** No. The low-end computer has a place—it introduces you to computing. And I think it offers so much fascination that the consumer wants more. I'm convinced that will happen.

*What will the home computer center look like in, say, 1990?*

**Cavalier:** First of all, I think you're going to have multiple computers in the home by the late 1980s. Here's an example. [Cavalier points to a large photograph of an Atari system arranged on some very simple, wall-mounted, high-tech furniture.] We're working with a company to develop some very functional, relatively inexpensive computer furniture—and as you can see, that particular furniture is designed for a child's room. You'll see computers in the children's room,

in the bedroom, and also as part of the entertainment center. Component television is already showing up; the computer will probably be a part of that system.

*How are consumers going to learn about computers?*

**Cavalier:** In many ways. I think you'll see computer learning centers popping up all over the country. Right now, in adult education, the number one, hottest courses are about computers. Manufacturers could do themselves a favor by creating easy-to-use, programmed texts that you could do at your own pace. Another thing, we have a toll-free number for consumers to call—it's a way to learn in the privacy of your own home, and you don't have to feel foolish about it. And, of course, 'here are the schools.


*How do you see the user interface changing? Will the kind of graphics/mouse technology we see in LISA and VisiOn show up in the home?*

**Cavalier:** Those technologies are already becoming pretty cost efficient. I think you'll see these kinds of interfaces, among others, in home computers within a year or two.

*How about speech recognition?*

**Cavalier:** It's not beyond the realm of possibility. Alan Kay, our head of research, is very up-to-date on speech input and output. But the technology isn't quite there yet. It's an interesting device, but it's not really useful yet. But it will become useful. It's the ultimate friendliness. Americans love to talk on the telephone, and this will be another device like that. Only it talks back to you.

*What can we expect from Atari?*

**Cavalier:** Expect to see a lot of things. We're very open-minded about the possibilities, and we think we really understand the market. We're starting to get some excellent statistics. We have people who have run packaged goods companies, who really know how to sell products to consumers. And the technology Atari offers will be as good as, if not better than, anything else on the market. 

---

*“The cartridge will be a very dominant force in the home market.”*

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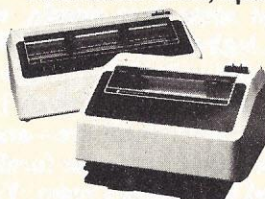
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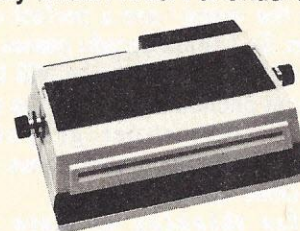


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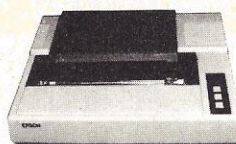
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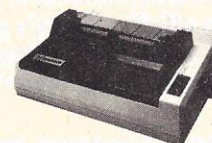


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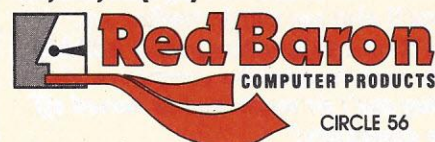
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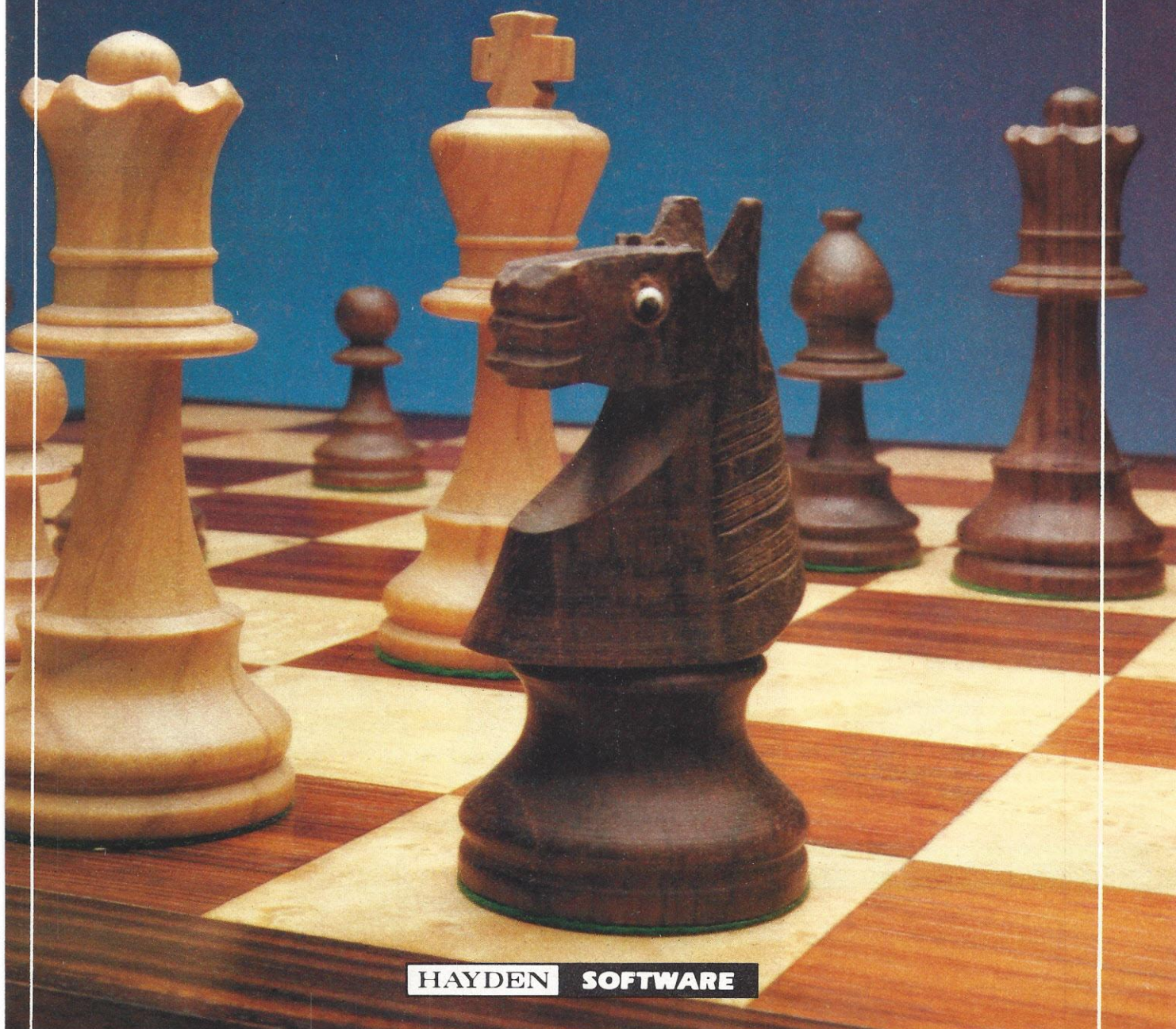
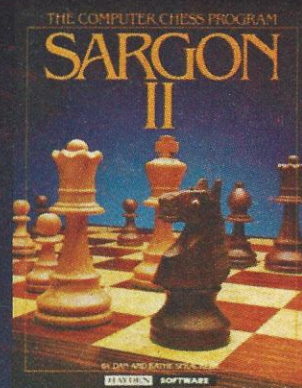
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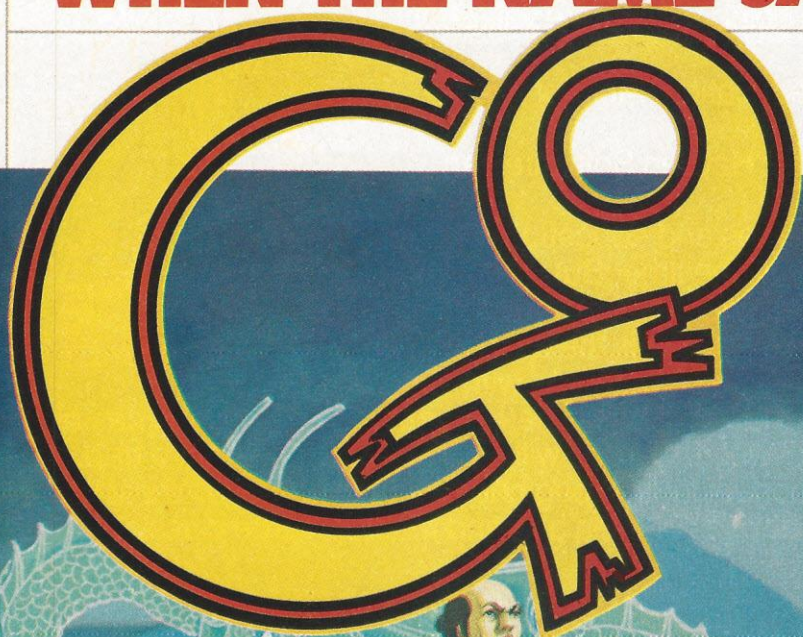
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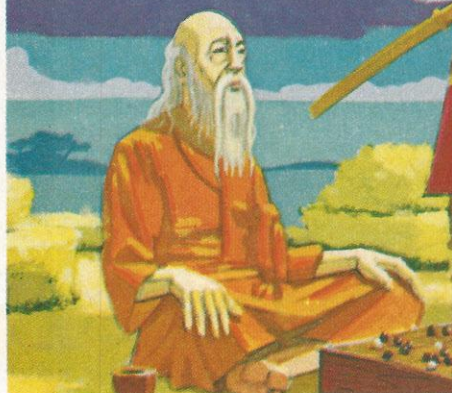
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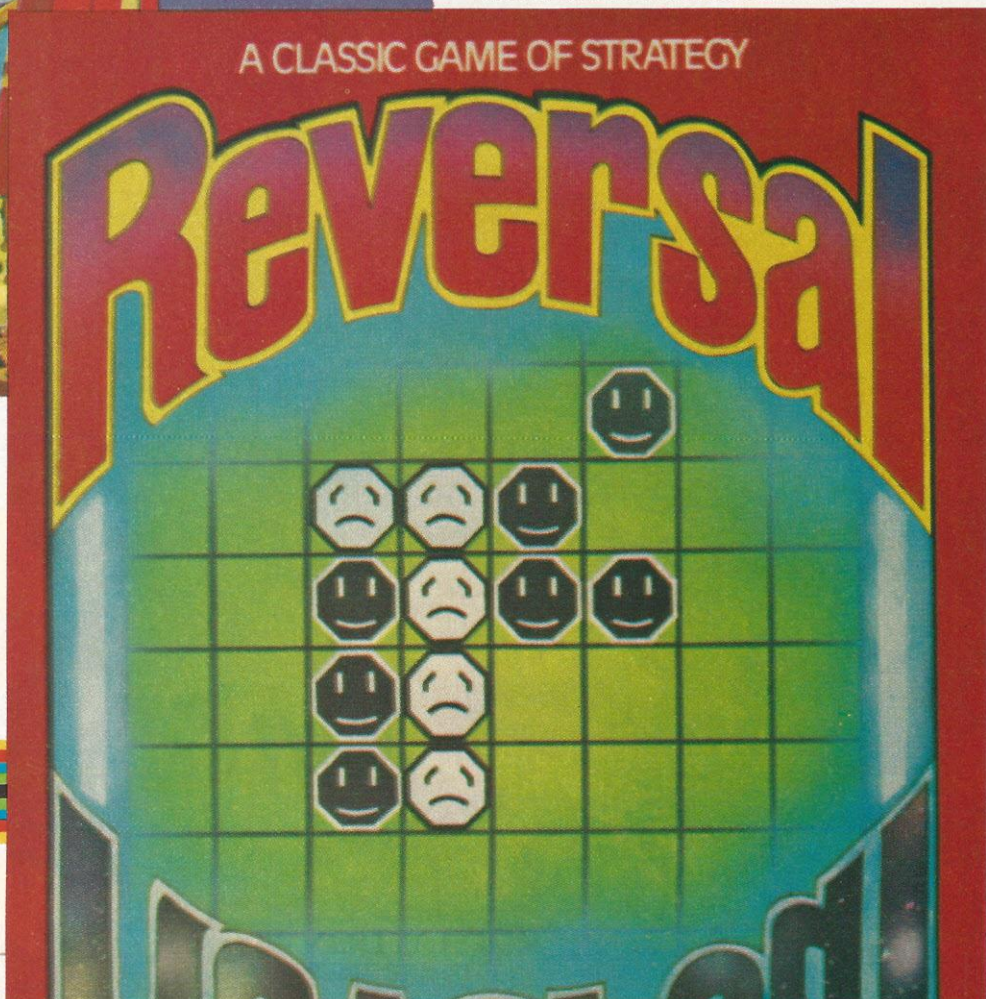
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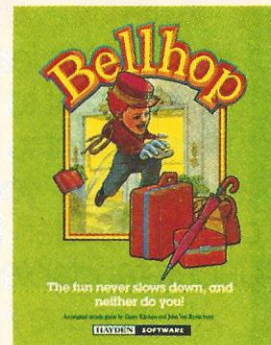
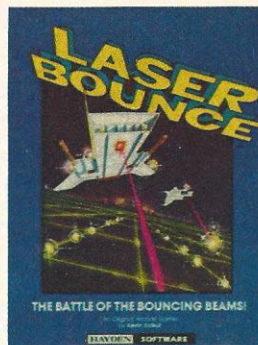
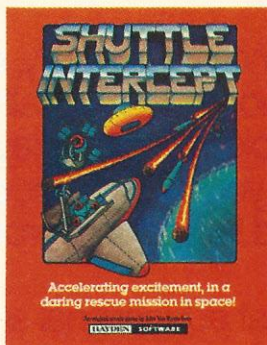
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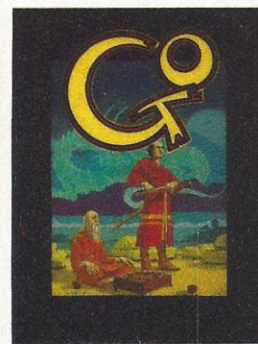
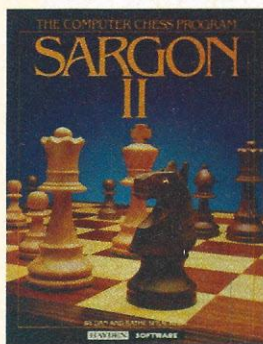
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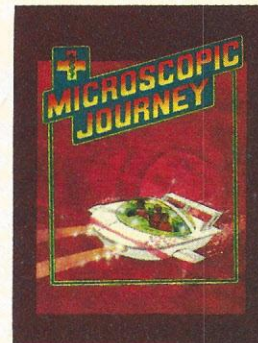
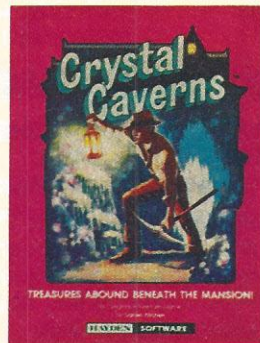
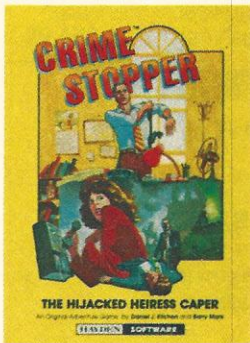
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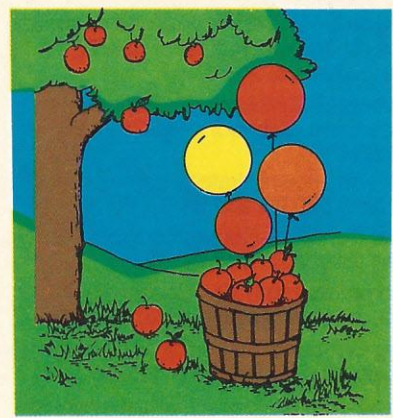
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# Computer Cure For A Doctor's Dilemma

When Dr. Chris Reilly found himself spending more time with his patient's accounts than with their ailments, he decided it was time to update his bookkeeping procedures. Personal computing was just the medicine he needed

*by Mike Barlow*

**L**ife used to be a lot less complicated for the rural doctor. Roaming the countryside in his 1936 Dodge, he made house calls, delivered babies and treated ailments with a combination of medical knowledge and common sense. Patients showed their gratitude with gifts of eggs and firewood, and accounts were settled over coffee in the farmhouse kitchen. That was before medical insurance, government regulation, and the AMA. Now, you'll hear doctors complain that they practically need a computer to keep track of their practices.

That may not be a bad idea.

A few years ago, gynecologist Chris Reilly's New Jersey practice was groaning under the weight of accounting and bookkeeping problems. Reilly found himself spending more time with his billing procedures than with his patients, and he didn't like it. That's when he started to think about getting into computers.

"We used to just type up the bills and send out photocopies," says the amiable 58-year-old doctor. "This was totally inefficient. And when the old 3-M copying machine started to

wear out, I decided it was a good time to get into computerization."

After some preliminary research, Reilly contracted with a Min-



**Dr. Chris Reilly of Paterson, N.J. found a solution to his business accounting problems by computerizing his billing and patient record systems.**

neapolis-based computer billing service. "That was the biggest disaster of my life," he says. "You shouldn't go with a computer billing service unless the firm hooks an on-line terminal into your office so you can monitor patients' accounts."

Reilly soon found that patients were receiving bills he hadn't seen yet, and others were being billed repeatedly for the same visit. "Suddenly it was as though we were running a customer service department in addition to a medical practice," Reilly says. "We had to give refunds to everyone who had overpaid. It was a real mess."

Determined to find a better way to organize the billing, Reilly attended an IBM computer seminar designed for medical professionals. He was so impressed with the presentation that he canceled the billing service and took the plunge into personal computing. He bought an IBM 5110 personal computer, an IBM 5114 disk drive, and an IBM 5103 dot-matrix printer. The hardware cost him \$20,720.

Reilly spent another \$2000 on a piece of IBM licensed software called Doctors Office Management System. Unfortunately, this package was no more helpful to Reilly's practice than the computer billing service had been.

"It had so many bugs in it that it screwed up my bookkeeping procedures more than before," Reilly says. "IBM didn't know where to start to correct them all. Eventually, the IBM folks just threw up their

---

*Mike Barlow is a journalist from New York State who writes regularly on business and computing topics.*



*It's all too easy to get so wrapped up in your work that you neglect the economic health of your office.*

hands and told me they wouldn't support the program anymore. Instead, they brought over three other software packages designed for medical practice bookkeeping and told me to choose between them. They told me that not only would they pay for the program I chose, but they would also pay for the transfer of my information from the failed software to the new package."

Reilly watched the three packages in action, and chose the one that seemed simplest to use. The program was Mycomp, distributed by Diatron, based in Colorado Springs, Colo.

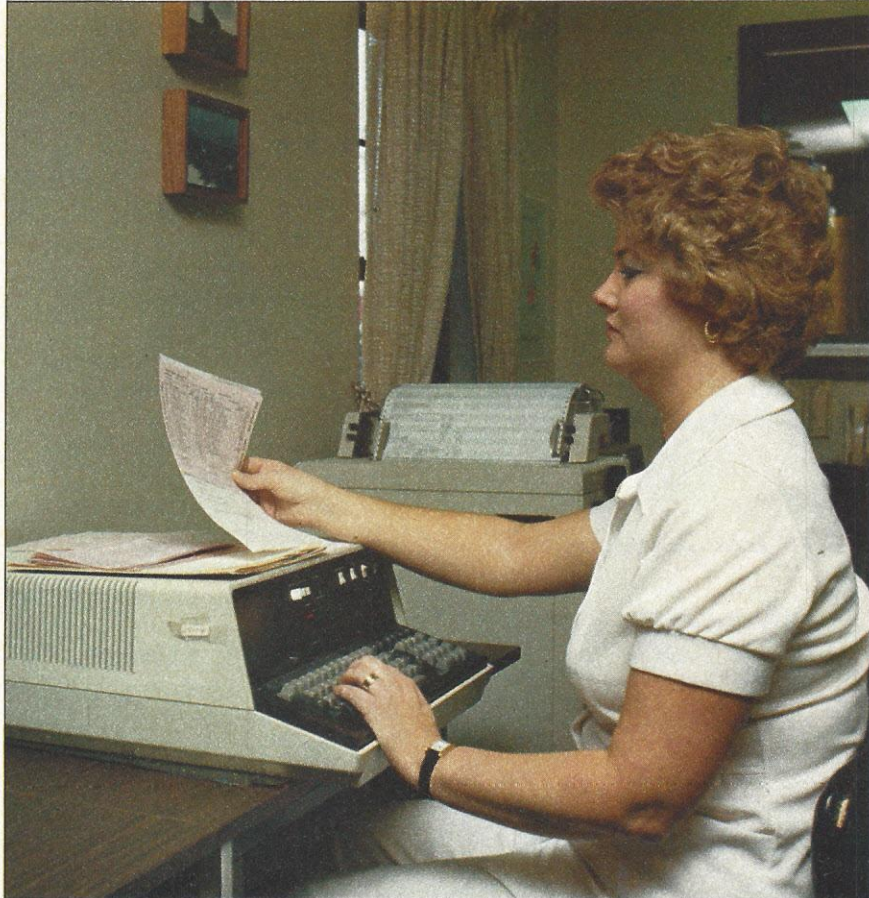
#### ***Worth the price***

For Reilly, Mycomp has proved to be worth its \$7000 price tag. He says entering data into the system is easy. Each patient is assigned an account number the first time her name is entered. From then on, every transaction, whether an office visit, a hospital visit, or a series of tests following the initial consultation, is added to the patient's record. Since Reilly has already programmed the cost of each gynecological procedure into the software, Mycomp automatically takes the new information and updates the patient's billing record. This last transaction also becomes part of the daily cumulative ledger.

The daily cumulative ledger lists the year's income to date and breaks down current unpaid bills into those 30, 60, or 90 days overdue. Reilly uses the daily reports to monitor the pulse of his business.

"The daily printout is really what makes the operation foolproof," Reilly says. Without hard copy, Reilly would have to rely solely on the diskettes for storing his data. Although he makes a duplicate of each diskette, he still feels electronic storage is too risky a proposition for a small businessman like himself. "If you lose the

**Reilly replaced his cumbersome filing system with an accessible, computerized record-keeping program (inset).**



**Reilly's assistant inputs patient information into the computer, which calculates billings and updates records. The system also keeps a cumulative ledger of the practice's income.**

information about who owes you money, you've got a problem.

"We collect about \$21,000 a month," Reilly explains. "About a third of that is from recent bills. Another third of it is from bills that are 60 to 90 days old. I can watch the movement of these payments in the daily cumulative records."

Through this process, Reilly can ensure that the payment pattern isn't interrupted. This is important to the maintenance of the practice's cash flow, and helps him to plan for future expenses.

When the computer shows a patient is falling behind in payments, Reilly sends out a reminder. If the bill continues to go unpaid, Reilly sends another letter suggesting the

patient opt to pay off the bill in regular installments. If the patient agrees, Reilly simply enters the number of installments agreed upon into the computer, and the Mycomp program figures out how much and when to bill the patient until the debt is cleared.

#### ***Confidence pays off***

Reilly, who refuses to use a collection agency, says his confidence in the computer has paid off. Because many of his patients prefer to pay their bills in regular installments rather than in lump sums, and the computer automatically generates each monthly reminder, Reilly winds up with fewer unpaid bills. The result, he says, is more money at the end of the year.

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***“There’s a distinct relationship between unpaid bills and dissatisfied patients.”***

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Reilly also uses the computer to design and send a questionnaire to patients with delinquent bills. “The questionnaire gives me a chance to find out why they haven’t paid. A lot of people aren’t paying because they can’t afford to pay.” However, sometimes the reason goes deeper. Reilly explains, “There’s a distinct relationship between unpaid bills and dissatisfied patients. This is something that is not widely appreciated by doctors.”

The implicit “message” in an unpaid bill assumes critical dimensions when one considers that dissatisfied patients can sometimes lead to unwarranted malpractice charges, Reilly notes. Sending an unpaid bill to a collection agency aggravates hostility and invites trouble. “That’s when a patient gets mad and goes to a lawyer.” The questionnaire allows a patient to express her hostility, and gives Reilly a chance to try and establish a better understanding of the problem.

In this way, Reilly feels his personal-computer billing system helps head off malpractice suits. The computer, which is programmed to print a monthly list of payments that are more than 180 days overdue, allows him to keep track of problem bills personally, without having to seek outside—and perhaps less tactful—help.

When it becomes apparent that a patient is not going to pay her bill, Reilly simply erases the transaction from the program. “Even with all this fancy programming, I still believe in the practice of medicine for itself, not as merely a business.”

Now that his accounting system is back on track, Reilly is exploring new ways to use his computer creatively. One new application he’s found is decision making. “The other day, we were notified that malpractice insurance rates would be lowered for gynecologists who don’t do any obstetrics. The difference in the premium would be about \$1400 a year.”

Some quick computing gave Reilly

a printout listing all the obstetrical procedures he had performed in the past year. Looking at the printout, Reilly discovered he’d earned \$20,000 from assisting in cesarean deliveries alone. “With the computer, I was able to find out that I made more than enough money to pay the extra premium. If I’d gone to my secretary and asked her to go through my patients’ files and figure it out with paper and pencil, she would never have been able to do it in any reasonable time.”

***New computer uses***

Reilly also used computer-backed logic when he decided to discontinue a complex yet largely unnecessary breast screening procedure. Reilly knew how much it cost him to run the test, but it wasn’t until he got the computer up and running that he was able to monitor how much he was earning from the procedure. Using the printouts, he soon realized that he was performing the test so infrequently that he was actually losing money by doing it in his office instead of recommending an outside laboratory. He had no qualms about his subsequent decision to shelve the screening procedure.

Reilly has found that computing gives him leverage in his dealings with outside institutions. For example, when he went to the bank to borrow money for new equipment, he took along reams of computer printouts. The printouts revealed in great detail which procedures were providing his greatest sources of income, convincing the bankers of his ability to repay the loan.

The year-end records are useful, too. “Blue Shield sends a statement at the end of each year showing how much they paid me. Now, for the first time, I’ll have something to compare it to: my own record.”

***Profits vs. productivity***


Although Reilly doesn’t share his practice with anyone, he can clearly

see how such a personal-computing system would be indispensable in a partnership. Because each type of medical procedure can be grouped and later broken out separately, each doctor in the partnership would be able to get an accurate monthly record of his or her earnings, Reilly notes. The ability to store and retrieve this information would easily allow partners to be paid in proportion to their actual productivity, rather than on the basis of an arbitrary and perhaps outdated agreement.

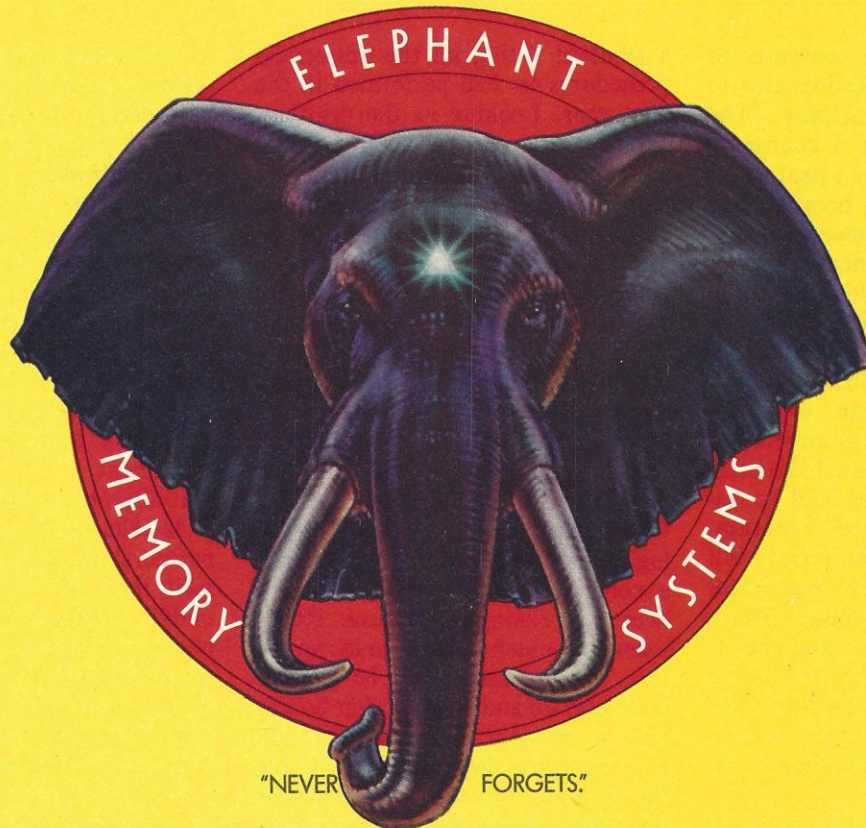
Reilly recalls his last partner with a chuckle. As was the case with most partnerships, Reilly and his colleague split their office income down the middle. Neither ever checked to see if one partner was doing more work than the other. When his partner left, Reilly naturally expected the office income to drop by half. To his surprise, it dropped only 20 percent.

That was a lesson he never forgot. In a field as complex as medicine, with its constant drama of life and death problems, it is all too easy to get so wrapped up in your work that you neglect the economic health of your office. But that kind of neglect can be just as devastating in the long run as not keeping up with the latest medical journals, Reilly says. Efficient and thorough records, courtesy of a personal computer, can reveal a world of trends that might otherwise go unnoticed—and free you to devote more attention to your patients. “The computer lets you know what you’re doing and where you’re headed.”

“I try to be part country doctor and part modern doctor,” says Reilly. “Both are important. You have to be able to cater to your patients’ needs without making them feel like you don’t care. The computer, even though it’s a machine, enables me to be more personal.”

And that combination of modern technology and the personal touch has made Reilly, by his own account, a more competent physician. 

# REMEMBER:



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But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to

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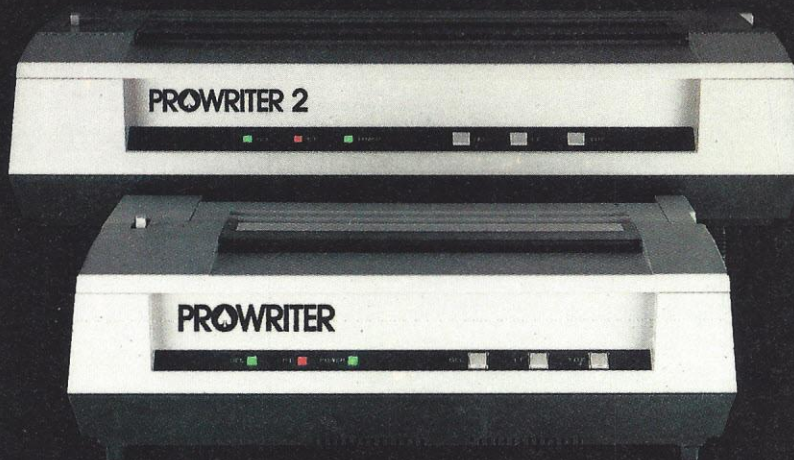
Finally, there's one full family of printers that covers every business or word processing application—all from C. Itoh, a company known for packing more product into less price; and all distributed exclusively by Leading Edge, a company known for searching out and providing that very thing. Which means that one call to one source can get you any printer, any time you need it, for any purpose. All backed by a full years' warranty from Leading Edge. (Try *that* on any other line of printers.)

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**The Prowriters: business printers—and more.** The "more" is a dot-matrix process with more dots. It gives you denser, correspondence quality copy (as opposed to business quality copy, which looks like a bad job of spray-painting).

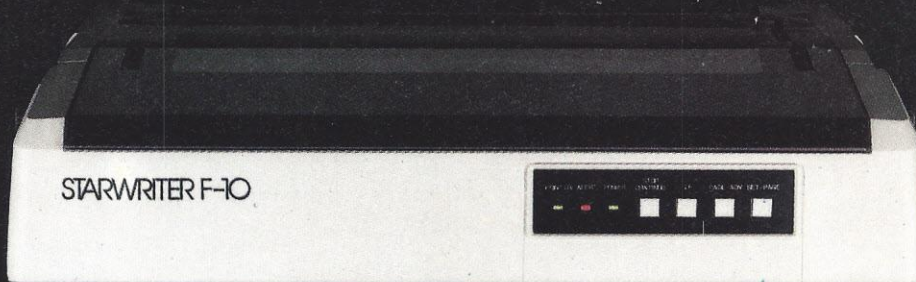
**Prowriter:** 120 cps. 80 columns dot matrix compressable to 136. 10" carriage. Parallel or serial interface.

**Prowriter 2:** Same as Prowriter, except 15" carriage allows full 136 columns in normal print mode. Parallel or serial interface.



## THE STAR.

**The Starwriter F-10.** In short (or more precisely, in a sleek 6" high, 30-pound unit), it gives you more of just about everything—except bulk and noise—than any other printer in its price range. It's a 40 cps letter-quality daisy-wheel with a bunch of built-in functions to simplify and speed up word processing. It plugs into almost any micro on the market, serial or parallel.



## THE MASTER.

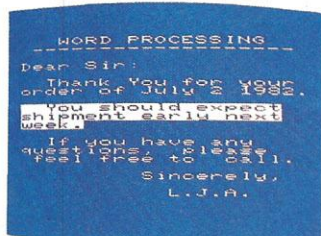
**The Printmaster F-10.** Does all the same good stuff as the Starwriter except, at 55 cps, the Master does it faster.



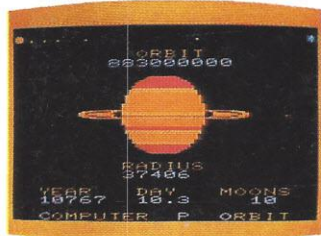
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CIRCLE 144

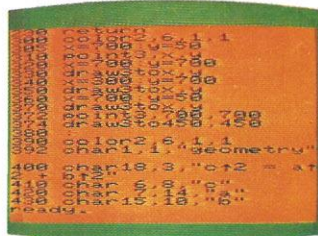
# IF YOU OWN A COMMODORE COMPUTER, YOU KNOW IT CAN DO ALL THIS.



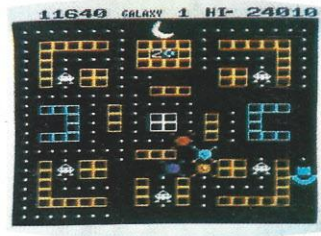
**BUSINESS**



**EDUCATION**

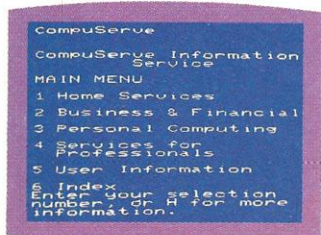


**PROGRAMMING**

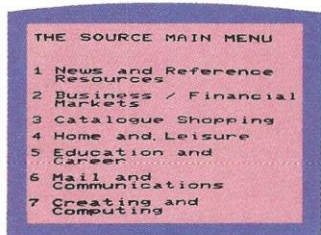


**GAMES**

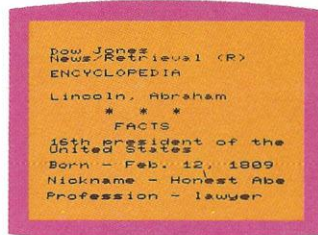
## BUT DID YOU KNOW FOR ABOUT \$100, YOU CAN ALSO GET IT TO DO ALL THIS?



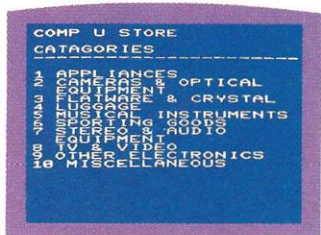
**COMPU SERVE™**



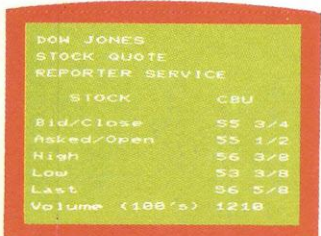
**THE SOURCE™**



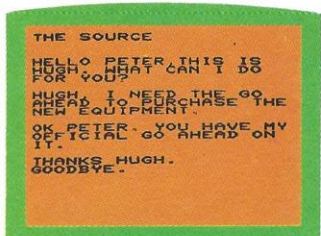
**ENCYCLOPEDIA**



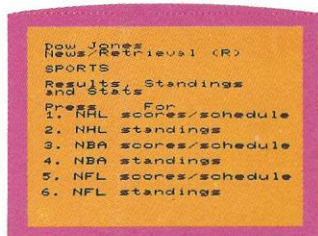
**SHOP AT HOME**



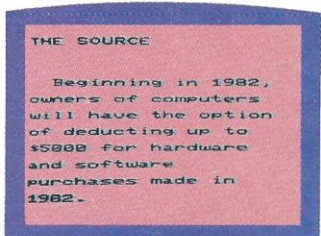
**DOW JONES  
NEWS/RETRIEVAL™**



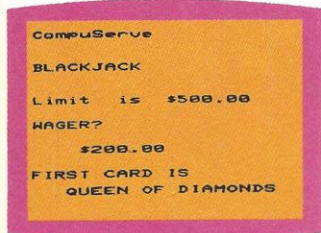
**ELECTRONIC  
MAIL**



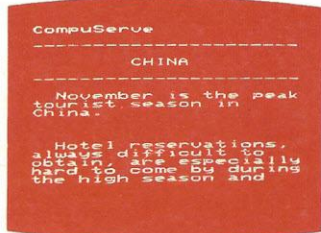
**WIRE SERVICE  
NEWS**



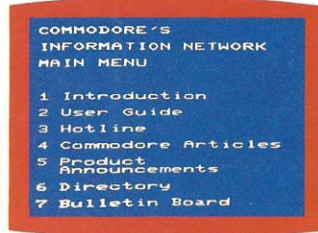
**TAX ADVICE**



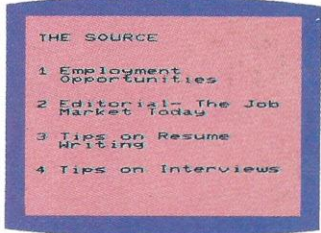
**GAMES**



**TRAVEL  
INFORMATION**



**COMMODORE  
INFO. NETWORK**



**EMPLOYMENT  
OPPORTUNITIES**



The screens at the top of the page show a few examples of how versatile the VIC 20™ or Commodore 64™ can be with the addition of Commodore software.

The screens below them give you a few examples of how much

more versatile they can be with the addition of a Commodore VICMODEM.

For around \$100, the Commodore VICMODEM will turn your VIC 20 or Commodore 64 computer into a telecomputer.

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an investment of about \$100.

Most computer companies think it's reasonable to ask as much as \$500 for a modem that'll give you telecomputing capabilities such as ours.

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